REPORT RESUMES

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THE EXPERIMENTAL DEALER TRAINING PROGRAM, CHANGES IN KNOWLEDGE, ATTITUDES AND PERFORMANCE OF FARM SUPPLY DEALERS, CHANGES IN BUSINESS FIRMS. RURAL SOCIOLOGY REPORT NUMBER 55.

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DESCRIPTORS- *RURAL EXTENSION, *MANAGEMENT, *AGRICULTURAL SUPPLY OCCUPATIONS, *BEHAVIOR CHANGE, *EXPERIMENTAL PROGRAMS, LEARNING THEORIES, ORGANIZATION, RESEARCH, ATTITUDES, KNOWLEDGE LEVEL, PERFORMANCE FACTORS, WORKSHOPS, EXPERIMENTAL GROUPS, CONTROL GROUPS, WORK ENVIRONMENT, EVALUATION CRITERIA, ANALYSIS OF VARIANCE, STATISTICAL DATA, LONGITUDINAL STUDIES, IOWA,

A RESEARCH PROJECT WAS CONDUCTED BY THE IOWA AGRICULTURAL AND HOME ECONOMICS EXPERIMENT STATION TO DETERMINE THE INFLUENCE OF AN INTENSIVE TRAINING PROGRAM FOR GENERAL MANAGERS OF LOCAL RETAIL FARM SUPPLY BUSINESSES DEALING IN FERTILIZER AND AGRICULTURAL CEHMICALS. CHANGES IN KNOWLEDGE, ATTITUDES AND PERFORMANCE, INTERNAL ENVIRONMENT AND ACTIVITIES OF BUSINESS FIRMS, AND ECONOMIC RETURNS OF THE TOTAL BUSINESS AND OF THE FERTILIZER AND CHEMICAL DEPARTMENTS WERE ASSESSED. EIGHT TREATMENT (TRAINEES), TWO ALTERNATE TREATMENT, AND EIGHT CONTROL DEALERS PARTICIPATED. THE TRAINING PROGRAM, CONDUCTED BY IOWA STATE UNIVERSITY EXTENSION SPECIALISTS, CONSISTED OF A FIVE-DAY WORKSHOP FOLLOWED BY 16 MEETINGS DURING THE NEXT TWO AND ONE-HALF YEARS. DATA WERE COLLECTED THROUGH PERSONAL INTERVIEWS CONDUCTED BEFORE, DURING, AND AFTER THE TRAINING AND FROM BUSINESS RECORDS. ONLY 11 OF THE 73 DERIVED EMPIRICAL HYPOTHESES WHICH COMPARED TREATMENT AND CONTROL MANAGERS WERE STATISTICALLY SUPPORTED, POSSIBLY BECUASE OF THE SMALL SAMPLE SIZE AND PROBLEMS OF OBTAINING PRECISE MEASURES OF CHANGE. FIVE VARIABLES OF KNOWLEDGE, TWO OF ATTITUDES, 13 OF PERFORMANCE, FOUR OF BUSINESS FIRM MANAGEMENT, AND 14 IN THE AREA OF ECONOMIC RETURNS FAVORED THE TREATMENT GROUP. (THE DOCUMENT INCLUDES 129 TABLES AND A BIBLIOGRAPHY.) (AJ)

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THE EXPERIMENTAL DEALER TRAINING PROGRAM

Changes in Knowledge, Attitudes and Performance of Farm Supply Dealers
Changes in Business Firms

by

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Chapter 1

INTRODUCTION

The planning, development, implementation and evaluation of educational programs are a primary concern of industry and educational institutions. Many types of short courses, field days, conferences and training programs are conducted each year to provide education and training on a wide variety of topic areas to numerous types of audiences. The major purpose of these types of educational programs is to provide assistance to individuals so that they can better fulfill their occupational roles. Although there is an abundance of literature on the planning, developing and implementing of training programs, a scarcity of literature exists on the measurement of the effect of these programs by experimentally designed research projects. The advisability of evaluating educational programs is emphasized but relatively few research projects have been designed to measure changes in human behavior resulting from participation in these programs.

In business and industry, only limited research has been completed on the impact of the training programs on the participants, especially those training programs attempting to change a complex behavior pattern such as management (40,74,115,122). As stated by Haire, "Unfortunately, the literature on the measured effect of training programs in industry is sparse . . . a great deal is said about the advisability of studying training, but relatively little has been done" (48, p. 63). Much of the training program research which has been done has been directed at job knowledge and job performance for production and clerical employees and insurance agents (13,75,119,127). Apparently, there is a need for systematic and carefully controlled research to measure the impact of training programs in business and industry, particularly at the managerial and supervisory levels (8).

This report is based on an experimental research project designed to determine the effect of an experimental training program conducted for ten retail farm supply dealers who sold fertilizer and agriculture chemicals as two of their product lines. From 1960 to 1964, this project was conducted by the Agricultural Experiment Station at Iowa State University of Science and Technology in cooperation with the Tennessee Valley Authority (2,97). Drs. George M. Beal and Joe M. Bohlen, Professors of Rural Sociology, Department of Sociology and Anthropology, Iowa State University, were co-leaders for both the educational and research phases of the project. Dr. Richard D. Warren was Project Coordinator for both the educational and research phases of the project.

The educational phase of this project consisted of planning, organizing and implementing an intensive training program for ten local retail farm supply and marketing dealers who sold fertilizer and agricultural chemicals. Intensive training was given in the areas of business management, merchandising and product information. The research phase included setting up the experimental design, designating the participating and control dealers and measuring the influence of this training upon the manager and his business firm. Nine of the ten dealers participating in the training program were salaried general managers for local retail farm supply businesses. One dealer was a sole proprietor.

The general project objectives were as follows:

1. To determine the impact of a combination of informational and educational techniques upon the adoption and use of fertilizer and fertilizer practices.
2. To determine the role which dealers may play in this process.
3. To appraise the efficacy of using a more intensive dealer training program to raise the level of fertilizer use to nearer an economic optimum.
4. To provide measures for evaluation of conventional extension methods relating to education on fertilizer use (97).

Objectives for both the educational phase and research phase of the project were also developed. The general educational objective was:

> To provide dealers with information, tools and training in basic business management and merchandising as well as product information on fertilizer and agricultural chemicals to the end that farmers would use fertilizer and agricultural chemicals to nearer an economic optimum. (2)

Based on this general educational input objective, five result objectives for the educational phase of the research project were formulated. These objectives were stated at different levels of expected training program influence.

Level A result objective was, to increase the dealers' (managers') knowledge and understanding about basic business management and merchandising and to increase their knowledge and understanding of product information on fertilizer and agricultural chemicals. This objective was also oriented toward bringing about desired attitude and perception changes in the dealers (managers).

Result objective level B was to motivate dealers to carry out certain actions and activities in their role as manager of a local retail farm supply business and as a dealer for fertilizer and agriculture chemicals.

Result objective level C was to help managers (dealers) achieve certain changes in the internal environment and activities of the business firm.

Result objective level D was to assist managers (dealers) to achieve certain outcomes in their business operations: 1) increased volume, efficiency and profits in their entire business and 2) increased volume and marginal profitability of the fertilizer and agricultural chemicals departments.

Result objective level E was to help dealers to assist in raising the farmers' use levels of fertilizer and agricultural chemicals in their respective trade areas to more nearly approach an economic optimum.

The general research objective was to measure the influence of the training program on the managers (dealers), their business firms and their farmer customers in those areas delineated by the general five result objectives of the educational phase.

This report will deal only with specific aspects of the general project. The analysis will be limited to the influence of the training program on the manager, his entire business firm, his fertilizer department and his agricultural chemical department.

The major objective of this report is to determine the effectiveness of an intensive program in bringing about predicted behavioral changes in the manager (dealer) and his business firm and predicted changes in selected economic returns of the business firm where the manager or owner-manager has a major role in the decision making. Therefore, the economic variables to some extent must be restricted to those economic variables which can be influenced by the manager of the local firm. This point will be developed more fully in the problem setting, theoretical orientation and methodology chapters.

In the next chapter, the problem setting, the situational setting of the retail dealer, the background of the study, the training program, the specific objectives of this report and plan of the report will be discussed.

Chapter 2

THE PROBLEM SETTING

> Thus we see that at this stage in the development of sociology we should not think of pure and applied research as being opposed. The two are not mutually exclusive. There is interplay between them, and there can be still more. Good theoretical research may be applicable to practical problems, and applied research can contribute to theoretical sociology. What is essential is that, even in applied research, a scientific frame of reference should be kept in mind. (41, p. 38)

It may be posited that there are two basic approaches to conducting research. One approach is to begin with a general level theory, conceptual scheme or theoretical propositions, deduce hypotheses and design an empirical project or experiment which will provide the opportunity to empirically test the hypotheses. In this case, the theory has major influence on the definition of the problem to be researched. However, in conducting action or program research the problem in the empirical world is often taken as given. Then the research worker must determine what theory(s) or conceptual schemes would be most meaningful to analyze the problem. In this sense, the problem has major influence on determining what theoretical orientation will be used and what theoretical propositions will be tested. In both cases, relevant theory can be used and tested.

Both the action or training phase and the research phase of this project began with an empirical problem orientation. Before relevant theory can be selected, for either the action or research phase, there is a need to define and view the dimensions of the problem. That is the major purpose of this chapter.

Changing Agriculture

American society is in a period of transition. In recent decades, rapid changes have occurred in the economic, social and political fields. Major changes have occurred in population, technology, economic and political organizations, major institutions, social organizations and values and beliefs (131). In modern times, industrialization, urbanization and population mobility have been outstanding characteristics of American society (131). Viewing society, in general, considerable adjustments and adaptations have been made and are being made to this changing environment.

The total complex of agriculture in the United States has experienced rapid changes in social structure, technology, the economics of production and marketing.

A broad concept of agriculture will be used in this report. Agribusiness has been defined as the total complex of agriculture, on and off the farm (83, 112). This includes: farming itself, the manufacturing and distribution of farm supplies and the processing and marketing of food and agricultural products. Therefore, the total complex of agriculture may be divided into three segments: 1) farmers who produce the farm products, 2) those industries which furnish farm supplies and related services to farmers, and 3) those industries engaged in the transporting, processing and marketing of farm products. It is estimated that slightly over one-third of all employed workers in the United States are employed in these three segments of the national economy (83, 112). In the early 1960's, it was estimated that approximately seven million people were employed on farms, over six million in farm supply industries and over ten million in agriculture processing and marketing industries (83,112).

In the farm segment, the rapidly changing environment has been characterized by rapid advances in agricultural technology, substitution of more and more capital for labor, increased average farm size, decreased total number of farms, increased productivity per man, improved production efficiency and a decrease in the number of farm people. These changes have affected both rural and nonrural communities.

Major changes are occurring in major institutional systems, social organizations and values and beliefs in both the American society and the agricultural sector. Larson and Rogers listed the following major rural social changes:

> 1) An increase in farm productivity per man has been accompanied by a decline in the number of farm people in the U.S.; 2) linkage of the farm with the nonfarm sector of American society is increasing; 3) farm production is increasingly specialized; 4) rural-urban differences in values are decreasing as America moves in the direction of a mass society; 5) rural people are increasingly cosmopolitan in their social relationships, due to improved mass communications, transportation, and the realignment of locality groups; 6) there is a trend toward a centralization of decision making in rural public policy and in agribusiness firms; and 7) changes in rural social organization are in the direction of a decline in

> the relative importance of primary relationships (such as in locality and kinships groups) and an increase in the importance of secondary relationships (such as in special interest formal organizations, government agencies, and business firms). (61, p. 42)

Those industries serving agriculture in supply and marketing capacities have also changed. The channels used for supplying purchased inputs to farmers and marketing farm products, as well as the institutional organization and structure, and services these industries perform are changing constantly. Farmers are becoming more and more dependent upon other segments of economy for production services and marketing services. While there has been declining employment on the farm, there has been an increase in the number of workers in both the farm supply and marketing firms. Between 1939 and 1959, the number of workers in food marketing increased 40 percent compared to a decrease of approximately 33 percent in the number of workers on farms. It has been estimated that five million persons were employed in the farm supply industry in 1947 and six million persons in 1954. During this period, persons employed on the farm decreased from ten million to eight million (83).

Resources used by the farmer are changing. Ogren and Scoville using USDA data, make the following statements:

> The total quality of resources used in farm production has changed little since 1940, but there has been a large increase in the use of nonfarm production resources. Over the same period, the quantity of operator and family labor, real estate and capital produced on the farm has declined by about one-fourth in terms of constant dollars. Purchased resources (machinery, fertilizers, hired labor, feed mixing services and additives, pesticides, veterinarian services, etc.) have increased by 40 percent. (83, p. 230)

It has been estimated that about 60 percent of all farm production expenditures are for off-farm goods and services (83).

There is increased specialization in the function of the farm firm and specialization in the role of the farm operator. As agriculture moved from the subsistence farming of a century ago to present day commercial farming, there has been an increasing dependence of farmers upon agribusinesses for purchased products and services on the input side and nonfarm market services on the output side. This trend in agriculture is an example of the more complex division of labor which has occurred as American society has changed from a more traditional social system to a more modern social system.

There is an interdependence between the three sectors of the total complex of agriculture. Also there is an interdependence between those three sectors of the economy and the other sectors of the economy. Conditions and adjustments in these sectors are influenced by total economic progress. These sectors also contribute to total economic progress and growth. Smith states:

> The improvement and continual recombining of the human, natural, and man-made resources are essential to economic growth. As growth takes place, agriculture and other segments of the economy become interwoven into a complicated pattern. The productive resources must move from one segment of the economy to another for greatest progress. (112, p. 3)

Retail Setting and the Problem

In recent years, much has been written about the changes, adjustments and needed adjustments of agriculture and rural society. Agricultural adjustment programs are being planned and implemented to assist the farmer and his family to adjust and to adapt to changing conditions. From an agricultural adjustment viewpoint, the businesses which serve in supply and marketing capacities are very important factors. The preceding discussion has pointed out some of the factors which give these businesses this importance. Many small town businesses face problems in adjusting and adapting to the changing agricultural situation. This area of agricultural adjustment has not received the attention that other areas have received.

This report focuses on an experimental project involving a training program for small town businesses serving agriculture in supply and marketing capacities. It is limited in scope and number of businesses. Only one category of dealers will be studied. The participating dealers in this training program were small town retail farm supply dealers who served farmers as sources of supply for fertilizer and agricultural chemicals as well as various other farm supplies.

Many of the farmers' purchases, especially those products used directly in their farming operations, are made from local businesses. The results of a Nebraska study indicated that farmers depend more on local businesses than businesses in larger towns and cities for food, feed, fertilizer, fuel, petroleum products, hardware and building materials. Large towns and cities are used disproportionately for purchases of clothing, furniture, appliances and machinery (3).

Similar results were obtained in an Illinois study conducted in Champaign County. Those centers designated by farmers as neighborhood centers were also to a large extent designated as the centers for sale of grain, elementary school for their children and church attendance. Those centers designated by farmers as community centers were also designated as the center usually used for banking, high school education, medical services, purchase of machinery, hardware and groceries. County seats or more distant centers tend to be used for dental care, sale of livestock, purchase of furniture and clothing, daily newspapers and movies (66).

United States farmers spent approximately $41 billion in 1962. Approximately $20 billion of this was spent in towns with a population of 30,000 or less. Farmers spent $1.6 billion in cities with a population of over 30,000. The balance, $19.8 billion, included expenditures such as hired labor, livestock purchases, taxes, interest, medical care, and other items. Much of this probably could be allocated to rural areas and towns of less than 30,000 population (123).

Phillips, using U.S. census figures, estimated that the aggregate gross sales of local marketing and farm supply businesses for the country as a whole came to $40 billion (95, p. 4).

A decreasing farm population in an area is often accompanied by a decreasing nonfarm population. Therefore, many businesses serving rural communities face adjustment problems. Those businesses which provide agricultural production inputs or serve as market outlets are relatively better off than those businesses which depend on absolute population numbers. Although the total number of farms and farmers is decreasing, the use of purchased resources such as machinery, fertilizers, prepared feeds and services is increasing. Increased total farm production and increased demand on the part of consumers for processing and marketing services connected with food products increase the demand for and use of firms engaged in the processing, distributing and marketing of farm products.

In addition to the products sold and processed, the local businesses provide many related services to the farm people in the community. Some of these services included grinding and mixing farm feeds, spreading commercial fertilizer, testing of soil, testing of seed, processing, packaging, storing, cleaning and transporting. Since the majority of activities of the local farm supply and marketing business are carried out directly with farmers, these farmer customers, in many instances, seek advice and guidance concerning their operations as they purchase farm supplies. Therefore it appears important that the manager and key employees in these businesses have an understanding of farm management and production principles and keep well informed on new developments in agricultural technology. Sound information and recommendations, quality production inputs and related services provided by these businesses should be a direct economic asset to the farmer because they make it possible for him to increase the efficiency and profits of his farming operation.

From another viewpoint, cost reduction and improved efficiency in the farm supply and marketing industries should be beneficial to farmers. On the supply side these factors should help reduce farmers' costs for purchased inputs used in their operations. On the marketing side, these factors might help in improving demand for farm products, permitting better prices for farm products and achieving greater stability of farm prices.

Local farm supply and marketing businesses often play an important role in the community. They contribute to the economy of the local community by providing employment for labor and through the payment of local taxes. In many instances, they play an important credit function in the farm community. Many local businessmen participate in community affairs, support civic organizations and activities and assume other civic duties and responsibilities.

The reasons for selecting fertilizer and agricultural chemicals dealers will be examined briefly in the following paragraphs. Commercial fertilizer and agricultural chemicals are two important technological innovations being used by farmers to increase production efficiency and financial returns. These products can increase efficiency by decreasing the per unit cost of crop production. The use of fertilizer and agricultural chemicals has increased substantially in recent years. While Iowa farmers have used increasing quantities of fertilizer and agricultural chemicals, educational institutions, extension workers and those in the fertilizer and agricultural chemical industries believe that the use of these innovations still falls below optimum levels. Optimum use is used in the context of marginal returns and marginal costs. It is difficult to determine optimum resource allocations which are generally applicable. Optimum levels of fertilizer and agricultural chemical use can be determined for an individual farmer. These optimum levels should be based on changes in production that result from optimum use of available resources. The farmer's goals, objectives, skills, knowledge and abilities may be considered in determining his optimum level of use. On a state or national basis the optimum potential is difficult to determine accurately because of the nature of production practices and aggregation problems. However, it is generally agreed that considerably more of these products could be used to an economic advantage by farmers. Estimates place the annual potential fertilizer use in Iowa between 1,500,000 and 2,000,000 tons (128). This would be about three times the present level of use, estimated to be approximately 660,000 tons of fertilizer (128).

The fertilizer and agricultural chemical dealer plays a vital role not only in the distribution of fertilizer and agricultural chemicals but he also is an important source of information about these products and their use. Though some questions are being raised about the present and future role of the dealer in the distribution and information system, the dealer still plays a major role in many parts of the country, certainly in Iowa, at the present time. In Iowa and other parts of the country, the most common method of farmer procurement of these products is by purchasing them through local farm supply dealers. In the distribution system, these dealers are the final link between the producer (industry) and the user (farmers). Many dealers provide many related services connected with these two product lines. Examples include taking soil samples, interpreting soil test reports, spreading fertilizer, sponsoring and conducting demonstrations, and providing rental equipment for application. One of the major fertilizer industry trends is the sharp increase in the proportion of fertilizer applied for farmers by dealers. Dealers by performing these functions may influence the amount and types of fertilizer and agricultural chemicals that are used by farmers in their production operations. Increasing the efficiency of these businesses and improving the qualifications of the dealer as an information source can be important to the farmer customer as well as to the businesses themselves.

The preceding discussion indicates that a potential for profitable increased use of fertilizer and agricultural chemicals exists. Therefore, a potentital for increased sales of these products also exists. There are two possible general benefits to be derived by increased sales of fertilizer and agricultural chemicals by retail dealers. From the dealer viewpoint, there is a potentital for increasing economic returns to the business by increasing sales as long as these products are sold at a profitable margin. From the farmers' viewpoint, they should be able to increase their profit by using more fertilizer and agricultural chemicals as a means of assisting them to lower their per unit cost of production and improve efficiency.

Increased use of fertilizer and agricultural chemicals could increase crop yields, output per man and farm production efficiency. Increased efficiency by the use of these products does not necessarily imply increased total crop production. It may mean increased efficiency of production on fewer crop acres. An increase in total crop production may or may not be a benefit to the farmer, other segments of agribusiness and/or to society; in the case of farm products which have an inelastic demand, increased production in itself can be detrimental.

With respect to agricultural production efficiency, the Extension Report on Scope and Responsibilities states:

> A nation of rural people must spend most of its manpower and energy in the endless quest for food. Only when men and women can be released from this struggle for food is it possible to produce the other amenities that result in a high standard of living. Thus, America's fabulous economic productivity rests, in a very immediate way, on efficiency in agriculture. The place that efficient farming plays in our nation's economic well-being cannot be overlooked or slighted.
>
> Interpreted accurately, efficiency means using land, labor, capital, and managerial ability in the best possible combination to get a marketable product with the least expenditure of productive resources. (124, p. 4)

Discussing efficient production from the standpoint of the individual farmer, the report states:

> Efficient production is the best single tool the individual farmer can use in his efforts to obtain a satisfactory standard of living. He cannot hope to gain a reasonable living standard with poor animals, low-yielding crops, and high production costs. (124, p. 6)

Some reasons for increased sales and use of fertilizer and agricultural chemicals as well as the role the dealer plays in this process has been briefly discussed. Education and training of persons are often suggested as a means of improving the communication and distribution systems for fertilizer and agricultural chemicals to the end that farmers would use these products to more nearly approach an economic optimum.

Training -- A Possible Solution

If the local farm supply dealer is to be a continuing part of the distribution structure and provide farmers with information, instructions and services related to fertilizer and agricultural chemicals, it appears essential that he have a basic knowledge of these products, their use, their application and have the programs and skills to communicate with and service the farmers. The recognition of this need has been verbalized by both industry and educational institutions. Also, most dealers who sell fertilizer and agricultural chemicals also sell other farm supplies and some are engaged in marketing activities.

The dealer needs to make many adjustments to a rapidly changing environment. As pointed out by Gordon and Howell:

> The model of the business world we are drawing is a dynamic one. The firm's organizational problems and needs are continually changing; change is the most important characteristic of the market and nonmarket environment in which it operates; the decisions involved in combining economic resources for the purpose of production and sale must continuously take account of changes which have already occurred or are anticipated. The businessman creates change and must adjust to change. He lives in an uncertain world that is in part of his own making. (42, p. 9)

Education programs should be of benefit in assisting dealers to adjust and adapt to the changing situation.

In a more general context, the education of workers and management personnel in farm supply and marketing industries is necessary to assist in making adjustments to a rapidly changing situation so that they may continue to contribute to general progress and efficiency of agribusiness. These contributions should be reflected in the total growth and progress of the nation. In regard to education in agribusiness, Smith states:

> With the specialized nature of agriculture or agribusiness more emphasis is needed on management. We also need to train people to work in the farm supply, processing, and marketing businesses as well as in farming. (112, p. 20)

In their article discussing changes in education, James and Ackermann point out:

> The training of farmers is important. We should continue to do the best job possible of training those who wish to return to the land, but this in itself is no longer adequate as the sole function of agricultural education.
>
> Producing efficient farmers is not enough. The supply industries as well as the processing and marketing industries must be efficient if we are to compete effectively with synthetic products and other regions of the world in the market place. As agriculture becomes more specialized and competitive, and as we seek better methods and greater efficiency, more advanced and broader knowledge is required. (55, p. 353)

Out of this general interest in and concern about retail farm supply and marketing firms and the specific interest in those selling fertilizer and agricultural chemicals, an intensive training program for a group of retail farm supply and marketing dealers who sold fertilizer and agricultural chemicals was developed and carried out.

The Training Program

The general project objectives, general educational objectives, and general research objectives were discussed in the introduction. The research design and selection of dealers will be discussed in the methodology chapter. In this section the general activities and the training program will be described.

General activities

The project started July 1, 1960 and the training phase ended June 30, 1964. Activities of the first six months included the planning of the content areas of the training program and selection of an area of the state in which to conduct the project. Early in 1961 the actual selection of dealers to participate in the training program was made. Ten dealers, representative of the various types of farm supply businesses in the area of the state in which the study was conducted, were selected to receive the training. The training was started in February, 1961 with a week long workshop and ended in April, 1963 with a product information meeting.

The people involved in planning the training program included: 1) the Iowa State University educational committee for the dealer training program, 2) the Iowa State University educational committee and representatives of the fertilizer industry, 3) all the dealers being trained, and 4) a dealer executive committee elected by the dealers using the training.

The members of the Iowa State University educational committee were: George M. Beal, Rural Sociology; Joe M. Bohlen, Rural Sociology; Harold Gunderson, Entomology; H. B. Howell, Agricultural Economics; Lee Kolmer, Agricultural Economics; Richard Phillips, Agricultural Economics (until February, 1962); Joe Stritzel, Agronomy; E. P. Sylwester, Plant Pathology and Botany; and Richard D. Warren, Rural Sociology.

At a general level, the major content areas of the training program may be designated in terms of basic business management, merchandising and product information on fertilizer and agricultural chemicals. Special emphasis was placed on: the fertilizer department; the agricultural chemicals department; the retail dealer's role with his farmer customers; long-range planning including systematic capital budgeting; certain service activities such as soil testing, interpreting soil test results and result demonstrations; merchandising, advertising and promotion; and resources available to the retail dealer, particularly in the area of information.

The discussion leaders for the five day workshop and the follow-up training meetings included Iowa State University staff members; representatives of the Tennessee Valey Authority, the National Plant Food Institute, the fertilizer industry, a consulting firm and a private retail dealer.

Most of the training was primarily for the managers of the business firms. However, key employees were invited to certain of the product information meetings.

The methods and media used to communicate the content of theories of training at the workshop and follow-up meetings were: 1) presentations by Iowa State University staff members, 2) presentations by trade and industry representatives, 3) a presentation by another retail dealer, 4) a presentation by a representative of a consulting firm, 5) distribution of notebooks and printed materials including summaries of presentations, 6) case examples, case problems, visual aids, homework assignments, and field demonstrations, 7) informal discussion sessions, and 8) "idea exchange sessions." In addition each business was visited periodically and individual assistance provided upon request.

Training program format and content areas

The training program in which the dealers participated consisted of a five day workshop and sixteen follow-up training meetings held over the next two and one-half years. The follow-up meetings varied in length from twelve hours (an all day meeting and an evening session) to three hour meetings. Some of the shorter meetings were held in the evening. The total number of hours of training was approximately 140 hours.

The workshop was conducted February 20 to 24, 1961. The last formal training session, a banquet and product information meeting, was held on April 2, 1963. From February, 1961 to June 30, 1964 individual assistance was provided to the treatment dealers who requested it..

Iowa State University staff members, with suggestions from representatives of the Tennessee Valley Authority and the National Plant Food Institute, planned the initial five day workshop, including content areas, the major points to be covered under each content area and time allocations. The majority of the workshop material was presented by Iowa State University extension specialists. The presentations, by content areas, made at the workshop were as follows:

1. Farmer market potential.
2. Dealer motivation.
3. Economics of the farm business.
4. Situation statement.
5. Basics of management--including a case example of management basics and techniques.
6. Dealer role, customer understanding, sociology and social psychology of education and adoption.
7. Some possible methods for use in building a better business.
8. Basic principles of fertilizer use.
9. Basic principles of weed control.

10. Basic principles of insect control.
11. Role of soil testing and demonstrations in fertilizer sales.
12. How to sell.
13. How Iowa State University makes recommendations.
14. How dealers can use Iowa State University recommendations.
15. Potential cooperative relationships with other agencies.
16. Follow-up training alternatives.

Five of the follow-up training meetings were in connection with a field demonstration conducted during 1961 by Iowa State University extension specialists, county extension staffs and the dealers in the training program. The purposes of the demonstration were: 1) to teach knowledge about and show the interaction effect of fertilizer, herbicides and insecticides; 2) to discuss and show the steps and procedures in conducting demonstrations; 3) to discuss the interpretation and presentation of results from demonstrations; and 4) to explain the use of demonstrations conducted within each dealer's trade territory as sales tools in selling fertilizer, herbicides and insecticides to farmers.

In addition to the discussion of long-range planning during the workshop, three days of follow-up training were spent on long range planning with emphasis on systematic capital budgeting. The presentations on systematic capital budgeting centered on the fertilizer department. However, the general procedures were presented in a framework that would be applicable to other departments in the business. Iowa State University extension economists discussed the decision-making process, presented the economic aspects of capital budgeting and provided the dealers with forms and procedures for systematic capital budgeting. Fertilizer industry representatives discussed product trends and recent developments in the industry. A representative of the Tennessee Valley Authority discussed fertilizer facility and equipment alternatives. The major purpose of these sessions was to provide the dealers with a systematic process and data needed for evaluating and appraising alternatives involving capital expenditures.

Advertising, promotion and merchandising were the content areas for two of the follow-up training meetings. This content area was approached from the point of view of a retail dealer selling products to his present and potential customers. This material was presented by Iowa State University staff members from both the economic and journalism departments.

Product information about fertilizer and agricultural chemicals was presented at six of the follow-up training meetings. Iowa State University specialists presented the majority of this material emphasizing basic principles and current recommendations.

Two fertilizer product information sessions were presented by representatives of the fertilizer industry. The first of these sessions was mentioned previously under systematic capital budgeting. The second session was held during the following year. The content included the fertilizer industry, product trends and possible impacts of these developments on retail dealers.

In addition to these training meetings, the treatment dealers were also asked to attend the annual Iowa State University Fertilizer and Agricultural Chemicals short courses held in January of 1963. Each of the short courses was a day in length and they were held on consecutive days.

A less formal aspect of the training program was dealer participation in the form of "idea exchanges," discussion sessions, and a certain amount of "homework" which they were asked to complete in connection with certain training sessions. The "homework" consisted mainly of gathering data and information which were used as a part of the systematic capital budgeting sessions.

At various times during the training program, including at the training sessions and during interviewing, the treatment dealers were given an opportunity to discuss and express their opinions concerning the content and type of training which they desired during the follow-up training period. Once a year, a three man dealer executive committee, elected by the participating dealers, met with Iowa State University staff members to discuss and formulate plans for the follow-up training program during the next year.

Attendance of the treatment dealers at these training meetings could not be made compulsory. It was realized that the dealers might find some of the sessions outside their interest area. It was also recognized that, due to ongoing business activities, it would probably be impossible for certain dealers to leave their business on a given date to attend a training session even though their interest was high and they perceived the area to be relevant to their business. However, dealers were strongly urged to attend all the meetings and attendance was very high, especially considering it was not always possible to schedule the dates for meetings to avoid conflicts with business and other dealer activities. Letters which discussed the purpose of each meeting and outlined the content areas and the time allocations were mailed to the dealers prior to each training meeting. An attendance record was kept and thus it is possible to control on this variable in the analysis. In all instances when a dealer could not attend a particular training session, he was given the training materials used at the meeting and they were sometimes explained to him on an individual basis by a member of the training staff.

During the training period, dealers accumulated a set of printed materials from the presentations. By the completion of the training program they had in their possession four loose-leaf notebooks which could serve as handbooks for reference purposes (78). By the completion of the training program the materials in these notebooks included reproductions of meeting summaries, Iowa State University pamphlets and bulletins, correspondence concerning training activities, fertilizer and agricultural chemical industry publications, suggested work forms and any notes of materials the dealers added themselves.[1]

Specific Objectives of the Report

In the preceding discussion in this chapter the situational setting of farm supply dealers was discussed and the training program outlined. The purpose of this discussion was to specify some of the dimensions of the problem context in which the action and research project was conceived. In moving from this problem setting to the construction of a theoretical orientation for research certain additional points appear relevant.

It is assumed that if an adequate training program is to be designed and executed the educator (trainer) must know and understand certain facts and concepts. It is assumed he must have some basic understanding of human behavior, i.e., how man things, how man learns, how he forms and changes attitudes and how man is motivated to learn, internalize, and use learned behavior (57, 73, 76). The trainer needs to know and understand the type of social system in which the trainee works, his occupational role in that social system, the goals and objectives of the trainee in that social system and the goals of the system. Further, the trainer has to know what changes in behavior can be expected in the trainee given the freedom and constraints which he has in his occupational role. The trainer needs to know the abilities, skills, areas of competencies and areas of deficiencies to which training can be directed. It is from these types of knowledge that the trainer may be able to design the content and methods of a training program and specify expected outcomes from the training. Unless these are taken into account it is questionable whether the trainer has a right to expect desired behavior changes.

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[1] Complete set of materials given to the dealers in the training program is available on a loan basis from Department of Economics and Sociology, Iowa State University of Science and Technology, Ames, Iowa.

The research worker needs to know many of these same concepts and data (37, 58, 64, 65, 70, 92). Without some data or assumptions about the adequacy to which these factors were taken into account in the design or execution of the training program the researcher would have a right to question allocating research resources to attempt to measure the effectiveness or adequacy of a training program. Many of the same types of data that have been suggested as needed by the trainer are also needed by the research worker if he is to attempt to specify his theoretical orientation, concepts and operational measures, and hypothesize relationships to test the effectiveness of a training program. These data, together with a knowledge of the content areas and methods of training and expected behavior changes, give guidance to the formulation of the research problem, the theoretical orientation and methodology.

When a training program has been adequately conducted, the expectation is that the experience will modify the behavior of the persons trained. If training is conducted for persons who are members of a business organization, the training is usually directed at changing the behavior of the individual receiving the training so that he can more adequately perform his occupational role. It is assumed the resultant behavior will result in certain activities that will contribute to the attainment of the goals and objectives of the organization in which he works. The personnel conducting this particular training program expected changes in the general manager's (dealer's) behavior, in the activities in the business firm and outcomes for the (results for his) business firm.

It was assumed that if certain aspects of the behavior of these dealers could be influenced in a desired direction then the efficiency and profitability of the business would be improved. In the special emphasis area of fertilizer and agricultural chemicals, it was assumed that the sale of these products could be increased. This program would provide the dealer with a learning situation. By providing new information, the training would have the potential of influencing the knowledge and attitudes of the individual dealer. If the dealers' knowledge and attitudes are changed in a favorable direction toward their businesses, their products, their services and their farmer customers, then this should be reflected in behavioral changes of the dealers, changes in services and activities of the business, and changes in economic and other outcomes in the business. This process and relationship of the concepts will be developed in more detail in the theory section.

In summary, from the viewpoint of both the trainer who is developing and implementing a training program and the researcher who is attempting to measure the impact of training an understanding of human behavior and the social system in which the training may be used by the individual trained is of vital importance. The individual, the social system, and the exchange (and interchange) between the individual and social system are important ingredients of the theoretical and conceptual framework for implementing and/or analyzing the impact of training programs.

In the theory section, the general hypotheses will be developed to test the adequacy with which this training program was conducted. In the methodology section, a brief discussion will be presented to determine if it is reasonable to expect certain changes based on the concepts, content, methods and procedures used in this specific training program. In this report, the attempt is to measure the adequacy of the training only in terms of outcomes not in terms of analyzing training methods, procedures and processes per se.

This report will deal with specific aspects of the general project. The analysis will be limited to the determination of the influence of the training program on the manager, his entire business firm, and his fertilizer and agricultural chemicals departments. The independent variable is the training program. For this study, the dependent variables are: 1) changes in the manager's knowledge, perceptions, attitudes, activities and performance and 2) changes in the activities of the economic variables (such as profit levels, volume levels, etc.) in the business firm.

In one framework, the economic variables could be conceived as the dependent variables and the other variables as intervening variables. Likert states, "Virtually all companies regularly secure measurements dealing with end results, such as production, sales, profits and percentages of net earnings to sales" (64, p. 61). Outcomes in non-economic variables such as in the area of employee relations, customer relations, organization structure, activities of the business, communication, decision making, etc. are important. Changes in these variables in most cases are reflected in the economic variables either in the short run or long run. Likert in his discussion of measurement processes used by most companies states:

> Much less attention is given, however, to another class of variables which significantly influence the end results. These variables, seriously neglected in present measurements, reflect the current condition of the internal state of the organization: its loyalty, skills, motivations, and capacity for effective interaction, communication, and decision making. For easy reference these variables will be called intervening variables. (64, p. 61)

In this study, an attempt will be made to quantify the changes in certain variables which could be classified as intervening variables, e.g., knowledge and attitudes could be conceived as intervening variables related to changes in firm behavior. Hougen has examined the effectiveness of the training program in bringing about predicted changes in selected areas of the dealer's knowledge and attitudes (54). At another level, variables associated with the performance of the dealer in his role as manager of the business could be conceived as intervening variables related to changes in firm behavior. Variables associated with the activities of the business firm could be conceived as intervening variables at the next level. It is assumed that "intervening variables" of the three classifications listed above will be reflected in the dependent variables for the firm. Baumol and Fuller in their attempt to construct and associate indices of management practices and environment with income and profit levels of the firm state the following:

> The effect of these indices on income and profits was estimated in a production function equation and in a reduced form profit equation. These indices explained a significant portion of the variation in both total income and return on fixed investment. (11, p. 865)

It is recognized that changes at one level may influence changes at other levels. For instance, changes in the manager's performance may bring about changes in the activities of the firm or economic returns for the firm. On the other hand, a change in economic returns for the firm may be a motivating factor for a manager to acquire additional knowledge, or to change an attitude, or to change performance.

If the training program changes the knowledge, attitudes and performance of the managers, these changes may influence the internal environment and activities of the business firm. If changes occur in these areas, then changes may occur in economic returns of the business firm. However, in this study, the interrelatedness of these changes will not be tested. Because of data limitations, the order of change, in many cases, is not possible to ascertain. The interrelationship of variables was discussed above to point out the relevancy of each of these areas in determining the influence of the training program. Changes in the following areas will be analyzed: 1) manager's knowledge, 2) manager's attitudes, 3) manager's performance, 4) internal environment and activities of the business firm, and 5) economic returns of the entire business, the fertilizer department and agricultural chemicals department. Changes in each of these areas will be analyzed separately.

The major objective of this report is to determine the effectiveness of an intensive training program in bringing about predicted behavioral changes in the dealer and changes in those areas of his business firm where the manager or owner-manager plays a major role in the decision making. Nine of the ten dealers in the study were salaried managers. The types of economic structure of the businesses involved in the study included those individually owned, farmer cooperative and corporation. Therefore, the emphasis will be placed on operational management and the outcomes for the business resulting from operational management. Although the division of managerial responsibility and internal environment may vary according to the economic structure, there is a common area in operational management. As stated by Baumel and Fuller:

> Full responsibility for operational management is normally assumed by the general manager. Thus, the general manager, whether he is salaried or the owner, is responsible for several distinct areas of management. (11, p. 858)

For the remainder of the report, the term general manager will imply the person who has responsibility for operational management of the local retail farm supply unit (firm) regardless of economic structure. The same meaning was implied for the dealer in the previous discussion.

The measurement of change is only the first step in measuring the efficiency of a dealer training program. At least two additional steps are necessary. First, the inputs of both the personnel conducting the training program and general managers need to be compared to the output to determine the efficiency of this type of training in relation to other alternative training approaches. Second, variables related to the differential influence of training programs on individuals and business firms should be examined. It is realized that training programs do not have the same influence on all participating individuals. An analysis of variables which may be related to differential influence on different individuals would provide insights which would be useful in planning and implementing training programs. However, before either of these steps can be accomplished, it is necessary to determine if significant changes occurred. Therefore, this report will be concerned with attempting to measure changes in: 1) the behavior of the general manager (dealer), 2) the activities of the business firm, and 3) the outcomes for the business firm.

For this analysis, the specific objectives are:

1. To determine the magnitude of predicted behavioral changes made by the general managers of local retail farm supply businesses as a result of participation in an intensive training program.

2. To determine the magnitude of predicted changes in selected internal environment and activity business firm variables.

3. To determine the magnitude of predicted changes in selected business firm economic return variables.

4. To determine the magnitude of predicted changes in selected business firm intervening and economic variables in the fertilizer department and agricultural chemicals departments.

Based on the above objectives, the two units of analysis in this report are individuals and social systems (business firms). The conceptual framework and analysis of data involve both individuals and social systems. The data for general managers will be aggregated to determine changes, i.e., general managers group mean differences between treatment dealers and control dealers will be compared. The data for business firms will also be aggregated to compare differences between treatment and control.

The conceptual framework in the theoretical orientations chapter includes a discussion of human behavior and social systems. The business firm will be treated as a special type of social system. The relevancy of the social system discussion is pointed out by Gordon and Howell in their discussion about the businessman.

> He must 'manage' a set of economic variables, but within an organizational context that helps determine the choices available to him and how he selects among alternatives. The decisions he makes are affected by the fact that he operates within a system of consciously coordinated activities. (42, p. 10)

The social system and environment in which the general manager operates must be defined and discussed. A discussion of formal organizations, environmental factors and management in retail business firms will follow the discussion of human behavior and social systems.

> First, the business firm is an organization. Second, the firm operates in an environment to which it is tied by both market (i.e., buying and selling) and nonmarket relationships. Third, within this environment and continuously adjusting to it, the firm is engaged in procuring and combining the services of men, money, and physical resources in order to create something for sale. If a primary objective of the organization is to make a profit from these activities, it is a business enterprise, even though it will also have other important objectives. If we eliminate the profit objective and the consequent need to generate sales revenues in excess of costs, the elements listed above will apply to all organizations, the more so as they engage in strictly economic activities. (42, pp. 8-9)

In the following chapter, theoretical orientations concerning human behavior, learning, social systems, formal organizations, retail business firms and management in the retail business firm will be presented to generate general hypotheses. In discussing general sociological orientations, Merton states:

> Much of what is described in textbooks as sociological theory consists of general orientations toward substantive materials. Such orientations involve broad postulates which indicate types of variables which are somehow to be taken into account rather than specifying determinate relationships between particular variables. (80, pp. 87-88)

Also, he states, "The chief function of these orientations is to provide a general context for inquiry; they facilitate the process of arriving at determinate hypotheses." (80, p. 88)

In the methodology chapter, the empirical hypotheses will be formulated. Empirical measures will be developed to enable the testing of the empirical hypotheses. In the findings chapter, the empirical hypotheses will be tested.

Chapter 3

THEORETICAL ORIENTATIONS AND DERIVATION OF HYPOTHESES

Introduction

The primary purpose of this section will be to examine and discuss operational management in local retail farm supply firms and to relate this process of management to theoretical orientations concerning adaptive human behavior and modification of behavior by training programs. Hypotheses will be derived concerning expected changes in adaptive behavior of the operational manager, outcomes for the operational manager and for his business firm.

Concepts and research generalizations from various academic disciplines will be drawn upon in deriving hypotheses concerning changes as a result of participation by dealers in the intensive training program. Principal among the disciplines from which theory and research generalizations will be drawn in analyzing behavior and behavior changes are economics, psychology, social-psychology and sociology. For hypotheses in reference to certain specific areas of change, the disciplines of agronomy, entomology, botany and plant pathology will be drawn upon to specify the type, quality and quantity of change which might be expected. This research and conceptual development is not intended to be a comprehensive and all-encompassing investigation of the training programs and related changes. It will be limited to aspects of a training program which provided training in specific content areas for general managers (dealers) for a category of retail businesses. However, some of the generalizations and implications may apply to a wide range of training programs directed at various audiences.

At the present stage of development, the social sciences have not developed bodies of knowledge which are neat, closed theoretical systems. They are somewhat eclectic. There is a wide range in the stage of development of the various theories present in the social sciences. No attempt will be made to present a comprehensive and all encompassing investigation of the theories relevant to dealer training programs, but rather, segments of them will be drawn upon to develop hypotheses judged relevant to this study. Although there is an abundance of literature on organizations and business firms, there is a lack of rigorous theories of organization, "unified" organization theory, or integrated theories from which principles of management may be deduced. As stated by Parsons, "An immense amount of work will be required before we can have anything that deserves to be called a theory of formal organizations" (89, p. 96). In general, the approach in deriving hypotheses will be more towards the eclectic than axiomatic.

This section will provide the theoretical orientations for measuring the effectiveness of an intensive training program for general managers of local farm supply businesses in which fertilizer and agricultural chemicals are among the product lines. The general hypotheses will be derived in this section of the report.

Basic Approach

There are various approaches to analyzing the impact of a training program upon the general manager of a retail farm supply firm. One approach would be to place it in a stimulus-interpretation-response framework. In this approach the training program would be viewed as the stimulus. The interpretation process as well as the behavioral responses made by the manager could be analyzed. The outcomes of the behavioral responses could be analyzed both in terms of the individual and the firm. Another approach would be to use an input-transformation-output framework where the training program would be the input and the manager in his business firm setting would be the mechanism of transformation. The output (outcome) could be analyzed in terms of individual behavior change and the firm. A third approach would be to view this process in a communication framework of sender-message-media-receiver, with the sender being the trainer, the message being the training program, the media being the methods and techniques used in training and the receiver being the dealer. Various aspects of this framework could be analyzed. These approaches per se will not be used in this study; however, some generalizations, propositions and implications of the findings from these approaches which are relevant will be used in the development of the conceptual framework.

In the present study, the basic approach will be that of the social system framework. The present intensive training program was directed at providing training to an occupant of a position in a particular social system. More specifically, the training program was conducted for the general manager of a retail farm supply firm--a social system. This study is directed at analyzing: 1) behavioral changes of the dealer in his role as general manager of a retail business, 2) changes in activities of this business, and 3) changes in operational outcomes of this business. The general setting for this approach is briefly outlined in the following paragraphs.

Individuals have various kinds of needs. The social environment provides guide lines by which choices among alternatives are made in determining behavior for the fulfillment of those needs. The individual is a member of many social systems and his behavior is influenced in part by these social systems as well as other social systems in society (which may also be considered a social system). As stated by Gross, et al., "That human behavior is in part a function of the actions and reactions of other members of the multiple social systems in which the individual lives and behaves and that it is influenced by normative or evaluative standards are basic notions of sociology and anthropology" (46, p. 32). Gross, et al., (46) also points out that the formulations of certain influential psychologists were instrumental in pointing out the importance of *interpersonal and cultural* influences for examining personality and individual behavior. There is an exchange between the individual and the social systems of which he is a member. Limiting our discussion to one social system, the individual "receives" from the social system certain norms of behavior, values, approved means for goal attainment, etc. to guide his behavior and is rewarded or punished for his behavior in that social system. In turn, at the end of the action sequence(s) by the individual, and because of it, the social system may have achieved or failed to achieve the desired result. The social system then may mete out either positive or negative sanctions in accordance with the quality of performance of the individual actor. In other words, the social system "provides" guides for the individual's behavior and in turn his behavior helps or hinders the social system in reaching some desired outcome. Rewards and punishments may be meted out by the social system according to the individual's performance in that social system.

The intensive training program was structured to provide information which would assist the general manager in his business firm. The business firm in which he is general manager will influence his perception, evaluation and the use made of the information received in the training program. The general manager has a number of reference points and is a member of other social systems in addition to the business firm; however, it is this social system which is the primary concern in this study. Because of the nature of the training, this social system is of prime importance from two standpoints. First, this social system (the business firm) compared to others will probably more directly influence his perception and evaluation of the training. Second, it is within this social system that the information from training will be implemented. It is realized that other social systems may influence his perception and evaluation of training. Also, he may use information obtained from the training program in other social systems, e.g., the training in decision making may be used in making family decisions. Although these other social systems are important, this study will be restricted to the changes in individual behavior pertaining to the business firm and changes in the business firm. Special emphasis is placed on changes in operational management of the local retail business firm. The general manager must manage a set of variables. He manages the variables within a local retail business firm context which places both potentialities and restrictions on alternatives available to him, on the process of selecting among alternatives and on the implementation of the decisions. The decisions he makes as well as the implementation and evaluation of these decisions are affected by the fact that he operates within a social system and this social system is linked to other social systems and to larger social systems such as an industry and the economy.

The first changes to be examined are those occurring in the behavior of the general manager. These behavioral changes include changes in knowledge and attitudes as well as changes in the quality of performance. Because of the relative size and degree of complexity of the small retail businesses in this study as compared to larger and more complex businesses, the various aspects of management are more nearly concentrated in one individual. Therefore, it is assumed that the general manager of the retail farm supply business in this study will be influential in bringing about changes in the activities of and outcomes of the firm.

The sequential development of this section will be first to consider a general framework of human behavior followed by an examination of generalizations and propositions concerning learning and attitude formation and change. The second step will be to define and discuss the environment in which the general manager makes and implements his decisions. More specifically, the approach to the second step will be: a) to discuss social systems at a general level, b) to present certain generalizations and propositions about the type of social system generally called formal organization, c) to analyze (or describe) the local retail farm supply firm as a social system and as a special type of formal organization, and d) to present generalizations and propositions about this system. The third step will be to discuss management and the functions of operational management in the local retail farm supply firm. The fourth step will be to derive and state the general level hypotheses.

All general level hypotheses to be tested in this study will be derived in this section. The method to be used in generating the general hypotheses will be essentially the method outlined by Zetterberg in his discussion of moving from theoretical propositions to ordinary propositions (136, pp. 79-82). His labeling of the proposition refers to the informative value of the proposition.

> In general, the larger the number of different ways in which a proposition can conceivably be proved incorrect, the higher its informative value. Put differently, the higher the informative value of a proposition, the greater is the variety of events for which it can account. (136, p. 79)

Based on the informative value, Zetterberg makes his classifications:

> Propositions of low informative value are legion, and I shall simply call them ordinary propositions. Propositions of high informative value deserve to be called theoretical propositions. (136, p. 80)

Reduction of the key terms is the method which the researcher uses in extracting ordinary propositions from a theoretical proposition. In his example, Zetterberg starts by decomposing a key term of the original proposition and then restating the proposition. Then he moves to another key term and continues until he has a special case of the original theoretical proposition. As stated by Zetterberg, after this proposition is applied to specific persons, times, etc., "We have gone from the theoretical to the ordinary" (136, p. 82). Also, he points out that, "The type of causal linkage in the special case is the same as the original proposition" (136, p. 82)

In his example, he does not label the various propositions extracted except at the start and at the end. The above procedure will essentially be the one used in this chapter. The propositions with the highest informative value will be called theoretical propositions. For purposes of distinction, the last stated propositions in this chapter will be called General Hypotheses and Supporting Hypotheses. The general hypotheses and supporting hypotheses will be operationalized in the next chapter and then the empirical hypotheses will be stated. In Zetterberg terms, these empirical hypotheses have the lowest informative value. However, if the procedure has been followed correctly, they will be special cases of the general cases. The sections and subsections of this chapter are oriented toward providing the "theoretical orientations" for the hypotheses to be presented. Also, the theoretical orientations provide the background for the causal linkage stated between variates.

Human Behavior

In the development of the conceptual framework to analyze the effectiveness of dealer training programs designed to bring about changes in behavior and outcomes certain assumptions and generalizations about human behavior are relevant. The basic premises of the specific approach to human behavior to be used in this research are: 1) most human behavior is learned behavior, 2) human learning and learned behavior can be communicated to other human beings without the phenomena present, and 3) human behavior is goal-oriented. These are important if the assumption is made that training programs have the potential for modifying behavior.

If training programs are to be implemented and evaluated an understanding of human behavior is essential. For an understanding of social systems both the individual and the social system must be considered. Human behavior takes place in situations where relevant aspects of the physical and social environment are present.

One of the first steps in understanding human behavior is to examine some of the basic characteristics of human beings which affect the way they interpret the physical and social environment. Berelson and Steiner state:

> How people come to know and interpret their world is fundamental to the understanding of human behavior, since behavior, as distinct from sheer motion, is action that takes environment into account. (21, p. 87)

Both the genetic inheritance of the individual and his environmental experiences influence his behavior. The biological characteristics of the man place limitations as well as give potentialities for human behavior and learning. The relative small biological differences which distinguish man from intrahuman primates have led to major behavioral differences. Man tends to organize the world around him into patterns of meaningful relationships. Bohlen and Beal state: "Because of the unique nature of his intelligence, he is inclined to place all the phenomena which he perceives into patterns of meaningful interrelationships" (24, p. 292). Man has been able to create and use complex systems of abstract symbols as in the case of written and spoken languages. Man can think abstractly. The importance of this ability is pointed out by Bohlen and Beal when they state:

> Man is able to go through the process of perceiving interrelationships because he has the ability to deal with abstractions. He can create symbols in his mind which have empirical referents in the universe about him. This frees him of the necessity of being in immediate sensory contact with phenomena in order to respond to them or act in relationship to them--a faculty unique to man.
>
> Because man has this ability to deal with abstractions and communicate via exchange of symbols with meanings, he has another uniqueness. Man is the only form of life which is faced with the necessity of making a distinction between those things which are real and those which are possible. All of the life forms below him must have sensory experience with "real" things in order to respond to them. There is no intellectually perceived future for any life form which cannot use symbols in its mental operation. Possibilities are always in the frame of reference to the future. (24, p. 292)

An individual perceives and interprets the physical and social environment in which he finds himself. The concept used to describe this process is cognition. Krech, et al., comments on cognition by stating, "Every man, through 'cognitive work,' attempts to construct for himself his own meaningful world, and he classifies and orders within it a multitude of objects, among which the most significant are other people" (60, p. 17). Even though each individual lives in his unique cognitive world, there are similarities in cognitive worlds of different individuals. The unique cognitive world of the individual is shaped by his unique experiences, his unique characteristics and his particular environment. However, . . . "there are many common features in the cognitive worlds of all people. This is true because all people have similar nervous sytems, share common wants, and cope with common problems" (60, p. 67). Cognitive worlds of individuals can be viewed as the product of four determinants: 1) the physical and social environment, 2) the physiological structure, 3) his wants and goals, and 4) his past experience (60, pp. 17-18). Therefore, the cognitive worlds of individuals who are members of a given social system increase in similarity "because of greater similarities in their wants and goals, in the physical and social environments to which they are exposed, and in their learning experiences" (60, p. 18).

Berelson and Steiner distinguish between adaptive behavior and instinctive behavior. They define adaptive behavior as, "Broadly, the ways in which an organism acts to satisfy its own needs and to meet the demands of the environment" (21, p. 38). Confining their discussion to human beings, they state, " . . . it also includes the fulfillment of subjective desires (e.g., pleasure, personal satisfaction) that are not always directly related to physical demands" (21, p. 38). For them, instinctive behavior is, "Innate tendencies to respond in particular, usually adaptive, ways to particular internal and/or external conditions" (21, p. 38). Much of man's behavior is adaptive behavior.

Man can recall mental images of past experience and project himself into the future. Man's responses to stimuli are based upon his interpretations of the stimuli which he receives. As stated by Bohlen and Beal:

> Man never responds to a stimulus per se. Whenever a human being is faced with a stimulus or problem, he responds not to it, but to the interpretation which he places upon it. He deals not only with the realities of the situation, but with the possibilities of it. Since he can deal in symbols, he can project himself into the future and mentally create alternative courses of action which he can evaluate and then make choices from this evaluation. (24, p. 293)

Adaptive actions of man are dependent upon previous learning and an understanding of consequences of these actions. The action forms of man which are most distinctly human are learned rather than instinctive. In their inventory of scientific findings in human behavior, Berelson and Steiner make the following statement: "Human behavior is more dependent upon learning and less regulated by instinct or other innate behavioral predispositions than the behavior of lower animals" (21, p. 39). Viewing learning in the broadest terms, Berelson and Steiner state that, " . . . learning refers to the effects of experience, either direct or symbolic, on subsequent behavior" (21, p. 135).

Adaptive human behavior is highly dependent on interpersonal relationships. The behavior of man is largely determined by their relationships to each other and their membership in social systems. Berelson and Steiner state: "Beyond its biological base, human behavior is learned behavior--learned principally from others, since the newborn infant has no instinctive knowledge or ability that would enable it to survive in isolation" (21, p. 65). Also important is the fact that language can be used to convey attitudes and values as well as knowledge. It can be used to express and arouse emotion. In regard to behavior, Hartley and Hartley state:

> It is obvious from the foregoing discussion that we hold almost all behavior of the mature individual to be socially derived, socially induced, or socially patterned. When we speak of the close connection between the socialization process and the process of personality formation, we are implying that personality is learned, just as social behavior is learned. Growing up in a group means learning to be a member of a group. It means perceiving what is considered to be correct and essential in a group, accepting these percepts as right, good, and necessary, and learning to behave in congruence with them. This process includes ways of thinking and feeling as well as ways of behaving, and it covers attitudes toward one's self as well as attitudes and behavior toward other people. Slowly and inexorably, objective evidence from several disciplines has driven us to this conclusion. (50, pp. 205-206)

The unit act

Because man has the ability to project himself into the future, he can select from alternative goals and choose the means for attaining his desired goals. In other words, man has some end state of affairs which motivates his behavior and can select means to this desired end. A goal is some desired end state of affairs or defined more precisely "a goal is a future relationship which an individual wishes to establish between himself and certain selected phenomena" (24, p. 292). Courses of actions which may be taken to achieve goals are considered means. In describing the preceding more concretely Bohlen and Beal (24) move to the unit act which is operationally the lowest common denominator of human behavior. It consists of 1) the receipt of a stimulus, 2) the interpretation of this stimulus and the circumstances under which it was received, and 3) a response or an action. In discussing the unit act, Bohlen and Beal state:

> Before man responds to any stimulus toward which he has not developed a habituated pattern of behavior, he weighs alternative goal choices in terms of the kind of outcome he prefers, and selects a means for attaining the choice he makes . . . whenever man receives a stimulus, he looks at his past experiences and asks himself what similar stimuli he has received or what similar problems he has encountered. In fact, it is doubtful that man will receive the stimulus unless he has had past experience with it, or a similar experience. Next, he asks himself how he responded or acted in relation to these similar stimuli when he had encountered them in the past. This would apply to both ends and means. He recalls his evaluation of his actions, and whether he was satisfied or dissatisfied with the outcomes of his action.
>
> Man relates his past to the future by asking himself if he wants the same outcomes or goals now as he did when he responded to the similar stimuli in the past. If not, what different goal(s) does he want to attain or consider? He projects to the future to determine if the same alternative means that were open to him in the past are still available. Are there more efficacious means now available? Only after he has considered his relevant past experiences and his projections of the future does he choose an alternative (end and mean) which best suits his values. (24, p. 293)

From a means-ends viewpoint, a goal for an individual at one point in time may actually be a means for the accomplishment of a more distant goal. A particular goal may be an end-in-view or intermediate step to the accomplishment of some ultimate goal. In this case, the goal becomes a means for the accomplishment of an ultimate goal. Thus, whether a particular state of affairs is a goal or mean depends upon the level of generalization.

Selection of goals and means

Implicit in the discussion of the goal-oriented action of the individual is that, over time, the individual is oriented toward the attainment of a multiplicity of goals which can be arranged hierarchically according to various criteria. How an individual selects goals and means will be discussed at this point. An individual develops a value system which is based on the accretion of judgments made about past experiences. He makes judgments in terms of the relative satisfactions gained from each of these experiences. This value system provided a base for interpretation of stimuli. Bohlen and Beal state:

> The individual's value system provides him with a set of tendencies to act in relation to stimuli which he receives. These tendencies to act are commonly referred to as attitudes. (24, p. 294)

Both ends and means tend to be hierarchically organized by the individual as a function of his value system. A value, as defined by Bohlen and Beal, " . . . is a subjective interpretation of the relationship which ought to exist between phenomena" (24, p. 291). Parsons in a discussion of the structural components of social systems states, "Values are modes of normative orientation of action in a social system which define the main directions of action without reference to specific goals or more detailed situations or structures" (89, p. 171). The normative aspect can be noted in both definitions.

Whether from the standpoint of the individual or the social system of which the individual is a part, values tend to be organized into systems. As pointed out by Williams, "Values are not simply distributed at random, but instead, are interdependent, arranged in a pattern, and subject to reciprocal and mutual variation" (131, p. 385).

The relationship between individual value systems and those identified as characteristic of a society or a social system is discussed by Parsons and Smelser. They state that:

> The most important similarity between personality systems and social systems is that they interpenetrate if they both possess common content of value patterns. But there are two fundamental differences as well: 1) since the contents of personality value patterns are derived by the internationalization of social role-objects in socialization processes, their hierarchy differs from that of the values of the social system. This is because the individual is socialized in specialized agencies (e.g. the family and the educational system) and in a determinate time sequence, not in, and through, the whole social structure all at once. 2) the specific goals and the adaptive and integrative exigencies of personalities differ from any social system. The value content is, in its implementation directed toward different problems. (91, pp. 176-177)

Although there are certain values which may be identified as characteristic of a particular social system, these values may be held with varying degrees of intensity by various individuals who are members of that social system. In the quote from Parsons and Smelser two situational factors which might influence an individual's value system were pointed out--differences in the socialization process and differences in individual problems and situations. The varying degrees of intensity with which individuals hold values in a social system may result in individual differences in goal orientation and thus to differences in adaptive behavior. By one classification, there are two main types of driving forces in human behavior--positive or negative. The positive forces are those which impel an individual to an object or condition and negative forces are those which tend to repel an individual away from an object or condition. Maslow (72) is often cited as giving a criteria for ordering of needs. Needs are defined as a continuing source of motivation for the individual (either positive or negative). The operationalization of the need or empirical referent is termed a goal.

Maslow's hierarchy of needs (from lower to higher order) includes the following: 1) physiological, 2) safety, 3) belongingness and love needs, 4) esteem, and 5) need for self-actualization (72). Maslow argues that higher order needs become activated (seeking satisfaction) only when the lower order, or basic, needs are satisfied. The characteristic of the lower order needs is that they recur and exist over time.

Needs and goals of an individual are reflected in his thought and action. Wants and goals vary from individual to individual. They also continuously develop and change. For a given need, many different goals may be appropriate. According to Krech, et al., (60) which particular goal(s) are selected and their rank-ordering by an individual depend upon several factors: 1) cultural norms and values, 2) biological capacity of the individual, 3) personal experience, and 4) accessibility in the physical and social environment.

The factors mentioned by Krech, et al., (60) also influence the individual's expectations concerning goal attainment. They provide criteria upon which the level of goal attainment is based. Level of goal attainment is a matter of degree not just a dichotomy of attainment and nonattainment.

As in the case of goals, there usually exists for the individual a multiplicity of alternative means which he could employ for the purpose of goal attainment. Based upon the previous means-end scheme, the criteria for ordering alternative means and their application are essentially the same as for goals: 1) cultural norms and values, 2) biological capacity of the individual, 3) past experience, and 4) accessibility in the physical and social environment or any combination of these factors (60). These might be paraphrased as cultural norms, cultural and individual values, the individual's capabilities and limitations, past experiences and accessibility of both means and goals. The importance of institutional patterns of culture in determining means and goal selection is pointed out by Parsons when he states, " . . . define the goals the actor is expected to pursue, the means among which he may choose and the sentiments and attitudes he should manifest" (85, p. 275). Individual differences in ability may be a factor in evaluating alternative means as well as awareness about alternative means. He can only select from those means of which he is aware. An individual may not be able to employ a given mean because it is not available to him in his environment or he lacks the physical or the social resources to implement the mean.

Action which is interpersonal will be discussed in the sections on social systems and formal organizations. Interaction among two or more persons will be viewed as a special type of action.

Conclusions and theoretical propositions

In general the postulated model of human behavior follows the means-ends schema of behavioral characteristics of economics, theories of sociology and certain motivational theories of psychology. In general, human behavior is a function of individual characteristics including biological, personal and social characteristics and the situation, including relevant aspects of the physical and social environment.

Based on the preceding generalizations about human beings and their behavior, the following basic premises are stated:

1. "Beyond its biological base, human behavior is learned behavior--learned principally from others . . ." (21, p. 65).
2. "Human learning and thus human adaptive behavior is communicated and therefore cumulative" (21, p. 44).
3. Human behavior is goal-oriented.
4. Human behavior is motivated.
5. Human behavior is normatively regulated.

6. Human behavior takes place in situations including relevant aspects of the physical and social environment.

Based on the preceding discussion, generalizations about human beings and basic premises, the following basic postulate is stated:

> Basic Postulate - Individuals (human beings) can create and plan (formalize) situations in which learning can take place as individuals communicate both verbally and nonverbally about human behavior and phenomena, which are not necessarily present.

For the remainder of the report, this will be referred to as formalized learning situations. This type of action and activities will be viewed as a special type of human behavior. Because learning refers to the effects of experience on subsequent behavior, then the concept change becomes relevant. A change must be relative to some original state of affairs. One way to view changes in adaptive human behavior would be to compare adaptive human behavior immediately prior to a formalized learning situation to subsequent adaptive behavior at various points in time. In controlled experiment conditions, the researcher is interested in obtaining a design for testing hypotheses about the casual relationships among variables. An attempt is made to minimize the effects of extraneous variables which might confound the results. In the classical experimental design, an experimental sample and a control sample are drawn in such a way that they are as nearly alike as possible at the original time period (time 1). Theoretically the samples are to be as nearly alike as possible in regard to all factors which potentially might affect the results of the experiment. In research dealing with the behavior of human beings, the "nearly alike as possible" controlling is a matter of degree and extreme difficulty is encountered in controlling all potential influences. Therefore, usually the most relevant factors are used for the matching. The presumed causal factor is introduced to the experimental sample but withheld from the control sample. Some type of measurement of the dependent variable is obtained for both samples at the original time period (time 1) and at subsequent time period (time 2). For both samples, the amount of change in the dependent variable between time 1 and time 2 is obtained. Any difference between the change for experimental sample and control sample is "interpreted" as being attributable to the causal factor. Some objective means is needed to determine if this difference is significant--attributable to the causal factor or just due to chance. In many cases, the objective evaluation is obtained by using a statistical test at a given probability level.

When intensive formalized learning situations occur over a period of time, these situations are only part of the experience world of the individual. The concern in this type of analysis is whether or not individuals participating in intensive formalized learning situations change certain aspects of their behavior more than "similar" individuals not participating in the formalized situations. Applied to the present study, do individuals who participate in a training program covering certain content areas, have greater changes in relevant aspects of their subsequent adaptive behavior than do "similar" individuals not participating in the same formalized learning situations. This implies that a particular formalized situation conducted over a time period will be only one of several formalized learning situations for the experimental sample. Individuals in the control sample will participate in other formalized learning situations but not the particular formalized learning situation. Also, formalized learning situations are only part of the experience world for individuals in both samples. In the case of a particular formalized situation conducted over a time period, the "similar" refers: 1) to the selection of individuals - similar characteristics and attributes at the beginning of the experiment and 2) to the experience worlds of the individuals of both samples - although not identical, it is assumed that relevant aspects of the social and physical environment will be similar during the experimental period and for a subsequent specified time period. The interest is not only "Do individuals participating in a series of formalized learning situations change relevant aspects of their subsequent adaptive behavior?" but also, "Is this change more than for 'similar' individuals not participating in a particular series of formalized learning situations?" Within this framework the following theoretical propositions are stated:

1. Individuals can be motivated to participate in a series of formalized learning situations.
2. Individuals participating in a series of formalized learning situations will have greater changes (direction predicted) in relevant aspects of their adaptive behavior in subsequent situations than will individuals not participating in the same series of formalized learning situations.

3. Individuals for whom learning has taken place as a result of participation in a series of formalized learning situations will have greater changes (direction predicted) in specified outcomes from their subsequent adaptive behavior than will similar individuals not participating in the particular series of formalized learning situations.

Specification is necessary to move the theoretical propositions to ordinary propositions. The concern in this study is with a special type of a series of formalized learning situations. The types under consideration are those which concentrated on occupational aspects of their adaptive behavior. The primary concern of this study is with: 1) formalized learning situations concerning the individuals' occupations, 2) subsequent behavior in their occupational roles, and 3) outcomes resulting from their carrying out their occupational roles. The following sections will deal with moving from the theoretical propositions to the ordinary. Moving from the high informative propositions to those of lower informative value, makes it necessary to discuss many relevant items.

The next section deals with how learning takes place and what factors influence learning. The discussion will center on knowledge, attitude and performance change. This section specifies the type of learning which is the major concern in this study and discusses some factors related to this type of learning. The theoretical propositions stated at the end of it will be at the next lower level. They will be special cases of the more general ones stated in this section.

Learning

A basic assumption of training programs is that they provide a learning situation for the participants (trainees). A training program conducted for individuals who are members of a particular social system may be conceived as the content and procedures used by those conducting the training to facilitate participant learning so that their resultant behavior contributes to the attainment of the goals and objectives of their social system as well as to the attainment of participants' goals and objectives. In this framework, a training program is not an end in itself but a means to an end.

Learning may be viewed as the development of the capacity of the individual to adjust to a changing environment. A stimulus is provided by a change in the individual's environment. Therefore, learning can take place. Training programs provide a learning situation and learning by the participants can take place. Stimuli are provided by content presented, methods of presentation and interaction with those conducting the training as well as other participants.

The central process in training program is learning. In analyzing the possible impact of training programs, it is necessary to be concerned with the nature of learning, how learning takes place and the variables which facilitate and retard learning. Most of the scientific study of learning has been carried on by psychologists. In the field of educational psychology, there is extensive literature available that deals with classroom teaching and ways to increase its effectiveness and efficiency. Extensive literature dealing with learning theory exists; however, as is true in other areas of social sciences, at the present stage of development neat, closed theoretical systems do not exist. A detailed theoretical discussion of learning will not be presented. Rather, several principles and conclusions will be extracted from learning theory. An eclectic approach will be used since there seems to be little agreement on a single theory of learning.

Learning has been described by Berelson and Steiner as:

> Learning: Changes in behavior that result from previous behavior in similar situations (as opposed to changes due to physiological variations such as growth, deterioration, hunger, fatigue, alcohol, or sleep). Mostly, but by no means always, behavior also becomes demonstrably more effective and more adaptive after the exercise than it was before. In the broadest terms, then, learning refers to the effects of experience, either direct or symbolic, on subsequent behavior. (21, p. 135)

Hilgard provisionally (because of many undefined terms) defines learning as:

> Learning is the process by which an activity originates or is changed through reacting to an encountered situation, provided that the characteristics of the change in activity cannot be explained on the basis of native response tendencies, maturation, or temporary states of the organism (e.g., fatigue, drugs, etc.). (51, p. 3)

In this study, learning refers to the process or processes which take place when an individual 1) acquires or changes knowledge, an attitude, or other covert behavior or 2) develops or modifies overt behavior as a result of factors other than growth and maturation or temporary states such as fatigue, etc. Learning will produce a different response by an individual to the same stimulus or the same response will be brought about by a different stimulus. Learning is a continuous process. Also, what is learned becomes a potential determinant for what more can be learned.

Before examining some additional aspects of learning theory and principles, limitations of the data when generalized to complex behavior of business managers should be pointed out. First, much of the present learning theory is based on experiments conducted in colleges and universities where the subjects were lower animals (21, 76). Some research has been directed at human learning with students as subjects. In business and industry, only limited basic research has been completed, in the area of learning theory. Second, relatively few experiments on human learning have involved the learning of complex behavior. There is considerable disagreement among the theorists and others as to what extent the principles developed can be generalized to other types or all human behavior. One point of disagreement involves generalization of principles based on lower animal experiments to human behavior. Another is the generalizations from simpler human behavior to more complex behavior.

In this study, it will be assumed that many of the principles of learning theory can be generalized to complex behavior in a business setting. Consequences of actions become more relevant in moving from the laboratory situation to a business situation.

In their discussion of training in a business and industrial setting, McGehee and Thayer state:

> The changes which take place in developing a skill are perhaps more obvious than those in acquiring knowledge and in developing the ability to solve problems and to make decisions. Certainly, the subtle changes in behavior which take place when an individual develops an attitude toward a given person or object are very covert. Although our information about behavioral changes which take place as an individual learns a conceptual or attitudinal response is not as well-documented as the changes in learning an overt motor response, it seems that a description of behavioral modifications as the result of learning is similar for the many forms of learning which occur daily. Uncertain and inappropriate responses diminish; specific and appropriate responses replace them. Behavior becomes organized and coordinated. (76, p. 132)

The factors which influence learning will be discussed at this point. The major factors which are relevant to the training programs are: past experience, motivation, set, reinforcement, meaningfulness, condition of practice, individual differences and the behavior to be learned.

Past experience

The definitions and descriptions of learning used in this study center on a description of behavioral changes in the individual which result from experience. It is inferred from an individual's behavior prior to and subsequent to specified experiences. Modifications in behavior as a result of tiredness, drugs, etc. have been ruled out. Learning then has occurred when a relatively permanent change in response patterns has taken place. The individual must perform before it is possible to tell if he has learned. For instance, in the case of knowledge, it is only possible to tell if he has learned by asking him questions or observing some other overt behavioral response. In the postulated model of human behavior, the importance of past experience in the responses of the individual was discussed. Past experience is a necessity to the abstract thinking done by man. The learning of complex, abstract, meaningful materials, involving the use of reasoning, is to a large extent a function of transfer of training. Transfer of training refers to the effect of past experience on a learning situation. According to Gestalt psychology, past experience is seen as affecting one's perception of a given situation. McGeoch states that transfer of training occurs whenever the existence of a previously established habit has an influence upon the acquisition, performance, or relearning of a second habit (77). Habit used in this context refers to a stable stimulus-response relationship. New learning that takes place is based on previously acquired habits. The influence of past experience on learning may be either positive or negative. If experience facilitates acquiring a new activity or ability, it has a positive effect, but if it inhibits learning, it has a negative effect. Past experience is a very important influence on what an individual learns by participation in a training program.

Motivation

As stated in the postulated model of human behavior, human behavior is goal-oriented. The individual is oriented toward the attainment of a multiplicity of goals which can be arranged hierarchically according to various criteria. The behavior of an individual will be oriented to the goals which are relevant to him. Although, for different persons there may be various levels of attainment as well as various expected levels of realization of a selected goal, an individual will attempt to achieve those goals which are salient during the appropriate time period. An individual responds best to that about which he is motivated. As stated by McGehee and Thayer:

> Learning theorists generally agree that an individual will learn more efficiently if he is motivated to some goal which is attainable through the learning of a particular sequence of acts and/or a body of knowledge. (76, pp. 134-135)

As previously pointed out, the individual may rank order alternative means available to him for goal attainment according to his preferences and values and their efficacy for attainment. Therefore, the behavior must appear to the individual as being relevant to achieving a given end as well as the end itself being desirable. In discussing motivation, Hilgard states:

> . . . goals of the learner almost surely affect both learning and performance. Motivation determines attention, and attention is related to cognitive restructuring, the form of learning that is supposed to be most detached from performance. (51, p. 469)

Also, he suggest, " . . . that motives are organized in some sort of hierarchy within the individual, resulting in a value-system expressed in behavior" (51, p. 469). Motives may be in conflict with each other. Attainment of certain goals may need to be postponed to achieve others.

The concept of motivation is very complex and many definitions are available on motivation. Berelson and Steiner define motives as " . . . an inner state that energizes, activates, or moves (hence "motivation"), and that directs or channels behaviors toward goals" (21, p. 240). They continue stating: "In short, a motive results in and hence can be inferred from purposive, means-ends behavior" (21, p. 240).

In application of motivation to learning, McGeoch gives the following definition:

> . . . a motive or motivating condition is any condition of the individual which initiates and sustains his behavior, orients him toward the practice of a given task, and which defines the adequacy of his activities and the completion of the task. (77, p. 194)

McGehee and Thayer state, " . . . a motivated person . . . is striving toward some goal" (76, p. 137). Therefore, a learner responds best to that about which he is motivated. Drawing upon the previous discussion three important points regarding motives (motivation) are important: 1) motives energize, activate and sustain the learner's behavior, 2) motives direct or orient his purposive goal-oriented behavior, and 3) those motives which are foremost within an individual's value system will influence his behavior.

The organization of motives within the individual will influence what the individual will learn and what he will want to learn.

Reinforcement

Under the assumption of goal-oriented behavior, motivation and reinforcement are closely related. Hilgard states:

> That there are goal tensions, and that the goal situation is an end-state that makes a change (either toward relaxation or elation) cannot be denied. In that sense, everyone must accept a reinforcement principle, meaning nothing more by it than that rewards and punishments matter for learning. (51, p. 468)

Although almost all learning theories deal in some way with the concept of reinforcement, rewards, punishments, consequences, or as labeled by some, the Law of Effect, there are wide differences of opinion as to the way the "Law of Effect" works in motivated learning. However, there is little question that positive reinforcers (rewards) do increase the probability of a given response occurring again and negative reinforcers tend to inhibit the recurrence of a response. Rewards and punishments do effect behavior. The perceptions of the individual who is learning will determine whether or not an event is reinforcing. A reinforcing event to one person may not be to another.

Following the general framework presented in human behavior, the perceptions of an individual about whether an event is reinforcing or not will depend upon the person's past experiences with such events and his present motives and goal orientation. The participant in a training program should recognize the need for training and the influence that it will have on the attainment of his goals.

Set

Learning is influenced by the "set" of an individual. Set can be described as the "total attitude" of an individual (51). Each individual has his own image of the world. As pointed out previously, this image is a product of 1) his physical and social environments, 2) his physiological structure, 3) his wants and goals, and 4) his past experiences (60). Individuals do not react equally to all stimuli in a given field. Cognitions of the individual are selectively organized. An effect of "set" is in channeling attention. It is important in the learning situation for the "teacher" to attract and hold the attention of the "student." Hartley and Hartley analyzing the influence of "set" upon the communication process state, "Attention is a function of 'set,' which is determined by cultural emphases, patterns of personal needs, degree of familiarity with the materials involved, and the immediate state of the organism" (50, p. 73). This total attitude or "set" determines what an individual will do at a given time and what will satisfy or annoy him. According to McGeoch, " . . . an active set to learn, with its accompanying selective processes and active response to the material practiced, is a powerful determiner of learning . . ." (77, p. 227).

Thorndike's law of readiness gives circumstances under which a learner tends to be satisfied or annoyed, to welcome or to reject (51). His readiness was a law of preparatory adjustment. It appears to be closely related to what is being called set.

Meaningfulness

Meaningful material presented in a meaningful manner is more likely to be learned and remembered than material which is not meaningful. Meaningfulness is used in the context that the learner can make associations for the new ideas and develop an understanding of the material. It must be meaningful to the learner. The implications of experimental findings examined by McGeoch suggest a high positive association between meaningfulness of material and original learning as well as transfer to other situations (77). Associations for new ideas and concepts help make material meaningful. In this context, new information in a familiar area is usually more meaningful. An entire talk may be more meaningful than just one paragraph from the talk. Of course, the nature of the material may influence whether whole or part learning is the most meaningful. Meaningfulness of the material to the learner is a function of his past experiences, salient matives and goals, etc. as well as the nature and method of presentation of the materials.

Other

Several other factors which influence learning could be considered. Several will be briefly discussed. Learning is influenced by practice and the conditions of practice because they influence original learning as well as transfer to other situations for certain types of behavior changes. Particularly in the areas of skills and knowledge, both covert and overt practices influence the learning and maintaining of these behavior changes.

In certain areas of learning, proper guidance can help to facilitate learning. Knowledge of results can facilitate learning provided proper timing is exercised and relevant results are presented.

Previous discussion has pointed out individuals differ in goals and motives which influence learning. Also, the conditions under which the training program is conducted influence learning. Individual differences such as age, sex, capacities, intelligence and motor abilities affect learning. These variables interact with the nature of the materials to be learned as well as the setting for the learning situation.

Attitude formation and change

A training program presents a set of situations in which attitude changes can be expected. The general principles discussed under human behavior and learning apply to knowledge, attitudes and "actual" performance. Attitudes will be discussed separately at this time because of their unique characteristics and their influence on other types of adaptive behavior. This discussion will be aimed at providing insights into the causes and the process of attitude formation and change.

Sherif and Cantril (104) who examined several definitions of attitudes concluded that an essential feature for definition of attitudes was a "function state of readiness" or a "predisposition to action." To differentiate attitudes from other states of readiness of the individual, they add the following criteria:

1. Attitudes always imply a subject-object relationship.

2. Attitudes are formed and formed in relation to objects, persons and values . . . attitudes are not innate but are formed as a result of the individual's contact with his environment.

3. Attitudes have affective properties of varying degrees.

4. Attitudes are more or less enduring states of readiness. (104, p. 301)

Attitudes, then, are latent variables which underlie action. They are " . . . an individual's tendency to act based upon his beliefs and values" (24, p. 292). As stated by Newcomb, "An individual's attitude toward something is his predisposition to perform, perceive, think and feel in relation to it" (81, p. 118). New attitudes can be formed and attitudes presently held by an individual can be changed. Persons hold attitudes toward those things they have contact with and about which they are motivated. An individual's past experience influences the attitudes he holds though they are subject to change because they are a result of the influence of his experiences. This change can be congruent or incongruent with the existing attitude held by the individual. Incongruent change is a change in valence in a direction opposite the original sign, whereas a congruent change is a change in valence in the direction of the original sign (60, p. 269). Training programs provide a situation in which attitude formation and change can be expected to occur. The factors related to attitude formation and change are: 1) information, 2) want or goal satisfaction, 3) personality, 4) group affiliation, 5) dissonance reduction, and 6) experience.

Krech, et al., state, "The attitudes of the individual are shaped by the information to which he is exposed" (60, p. 186). Exposure to information such as that presented in a training program may create new attitudes or, more likely, influence pre-existing attitudes. Source, medium, form and content of information and predispositions are all factors influencing the direction that the attitude may take and the degree of change which will result from an exposure to additional experience. In the goal-oriented behavior of individuals, attitudes may form or change as individuals go about solving the problems of satisfying their needs or goals. As mentioned previously, goal attainment is a matter of degree; therefore, favorable and unfavorable attitudes develop toward objects and persons that influence the degree of goal attainment. The values of groups in which the individual has participated, is participating, or would like to participate influence the development and organization of the attitudes of the individual. Individuals reflect the beliefs, values and norms of their groups. The relationship between values of the social system and of the individual was previously discussed. Attitudes were defined as the individual's tendency to act based upon his beliefs and values. Attitude formation and change are related to group contacts and affiliation.

Attitudes may be formed or changed in an effort to reduce dissonance. An individual strives toward consistency within himself, and attitudes and opinions exist in clusters that are internally consistent. Festinger, in his theory of cognitive dissonance, indicates that efforts to reduce dissonance will result in certain decisions made by the individual. He states: "The existence of dissonance, being psychologically uncomfortable, will motivate a person to try to reduce dissonance and achieve consonance" (36, p. 4). Reduction of dissonance may be attempted by a change in behavioral cognitive elements. As stated many times before, past experience influences the behavior of the individual. Attitudes are a result of the experiences which an individual has had. New experiences may influence the attitudes of an individual.

Krech, et al., list seven attitudinal characteristics which are important in affecting modifiability of attitudes: "1) extremeness, 2) multiplexity, 3) consistency, 4) interconnectedness, 5) consonance, 6) strength and number of wants served by the attitude, and 7) centrality of the value to which the attitude is related" (60, p. 216). Those attitudes which have lower susceptibility to change are: extreme attitudes, a highly multiplex attitude, those in a consistent attitude system, those highly interconnected with others, those which are consonant with the other attitudes in the cluster, attitudes which serve a high number of wants, attitudes which serve wants held strongly, and those which stem from basic values of the individual (60).

Knowledge, attitude and performance

Many relationships between attitudes, knowledge and performance have already been discussed or implied in the previous discussion of human behavior and learning. A few points will be highlighted in this summary. Acquiring knowledge, attitude formation and performance changes can all be explained with a stimulus-response-reward learning theory. Attitudes, knowledge and performance activities can all be learned. Therefore, an adequately conducted training program could have an impact on knowledge, attitudes and performance. They are components of adaptive human behavior.

The learning of knowledge, attitudes and performance activities is related to many of the same variables. McGehee and Thayer state:

> . . . attitudes, as are other forms of behavior, are acquired as a function of experience; they are learned. This means that in attempting to develop or modify attitudes in an industrial situation we are confronted with the same type of problem we meet when we try to teach an employee a skill or impart knowledge. (76, pp. 169-170)

There is a direct interaction between attitudes and knowledge. Attitudes may be learned as knowledge is learned. Attitudes influence the knowledge that is learned. Another relationship is that of attitudes and knowledge to performance. While performance is a result of knowledge and attitudes, attitudes and knowledge are affected by action taken. The results of action influence attitudes and knowledge and the selection of means to achieve goals in the future. The degree of goal attainment in one situation may influence the individual's attitudes and knowledge. Also, it may influence subsequent action to reach a desired goal.

A training program can be considered as a series of formalized learning situations. Usually training programs are extended over a time period from one day to several years. The length and complexity depend on the material to be covered and the type of audience. Although a training program is a formalized learning situation, in that it was created and planned by individuals, many informal relations will develop among the individuals participating in a training program. Adequately conducted training programs imply proper consideration has been given to those relevant variables, some of which were discussed in this section, that influence the learning of knowledge, attitudes and performance activities. It is assumed that a situation has been provided in which learning can take place. Learning is influenced by social and personal characteristics of the individuals receiving the training, social and personal characteristics of the individuals providing the training, and the situation including relevant aspects of the social and physical environments.

Based on the discussion of learning, the theoretical propositions will be restated:

1. Individuals can be motivated to participate in an adequately conducted training program.

2. Individuals participating in an adequately conducted training program will have greater changes (direction predicted) in relevant aspects of their adaptive behavior than will similar individuals not participating in the same training program.

3. Individuals participating in an adequately conducted training program will have greater changes (direction predicted) in specified outcomes than will similar individuals not participating in the same training program.

Based on the discussion of learning and the area of interest of this study, proposition 2 will be restated involving three areas of behavior. The three lower level propositions are:

A. Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their knowledge in those content areas included in the program than will similar individuals not participating in the same training program.

B. Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their attitudes than will similar individuals not participating in the same training program.

C. Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their performance than will similar individuals not participating in the same training program.

The two units for analysis in this report are individuals and social systems. The individuals are divided into two classifications - individuals participating in a training program and similar individuals not participating in the same training program. The social systems are divided into two classifications - business firms of individuals participating in a training program and business firms of similar individuals not participating in the same training program.

Although all the stated general generalizations about human beings and premises about human behavior have importance for training programs, one of the generalizations is central to evaluating training programs, "Beyond its biological base, human behavior is learned behavior - learned principally from others . . ." (21, p. 65). There are two very important implications from this statement.

First, an individual can learn human behavior from other individuals. Interaction can be viewed as a special type of human behavior. "The social system is composed of the patterned interaction of its members" (68, p. 4). Much of behavior of the individual is influenced by the social system in which the individual has participated, is participating, or would like to participate. Regarding formalized learning situations, this implication was stated in the basic postulate: individuals (human beings) can create and plan (formalize) situations in which learning takes place as individuals communicate both verbally and nonverbally about human behavior and phenomena, which are not necessarily present.

Second, other individuals can learn behavior from an individual. Therefore, in varying degrees, an individual influences the behavior of other members of a particular social system. The amount of influence one member has on the behavior of other members of a social system depends upon many factors such as the type of social system, the characteristics of the social system, personal and social characteristics of the individual and the situation including relevant aspects of the physical and social environment. With the above factors considered, an individual has impact, to some degree, upon the social system in which he is participating. In a particular social system, a member has some degree of influence on the behavior of other individuals in the system. Therefore, the behavior of one member of a social system has some degree of impact on the activities, organization, effectiveness and efficiency of that particular social system.

The following sections on social systems, formal organizations and the retail business firm will be used to generate more specific theoretical hypotheses about performance changes and outcome changes.

Social Systems

Out of the total action system of an individual, ordinarily much of the action is interpersonal. Interaction can be viewed as a special type of human behavior. When patterns of interaction have become orderly and systematic over time, the concept social structure is used to characterize it. A social system has been formed. Much of individual human behavior including both covert and overt behavior is guided or influenced by the social systems in which the individual has participated, is participating, or would like to participate. An individual ordinarily is a member of many social systems. Participation in a particular social system will have an impact on the individual as well as an impact on the social system.

Loomis states four assumptions about human action made by social scientists. Action: 1) takes place in situations including relevant aspects of the physical and social world, 2) is conducted in terms of anticipated state of affairs, 3) is motivated, and 4) is normatively regulated (68, p. 2). Loomis views interaction as a special type of action which has certain additional distinguishing attributes. "The important characteristics of interaction include:

> 1. a plurality of actors
> 2. communication between actors by means of a set of symbols
> 3. a 'duration' or time dimension possessing a past, present, and future, which in part determines the character of the on-going action
> 4. an 'objective' whether or not its specification from the viewpoint of the actors coincides with that of an objective observer." (68, p. 2)

Certain interaction becomes recurrent and patterned. Social structure is a concept used to describe the identifiable and interdependent parts of interaction which have become orderly and systematic over time. Smelser states:

> 'Social structure' is a concept used to characterize recurrent and regularized interaction among two or more persons . . . selected aspects of interaction among persons, such as roles . . . and social organization, which refers to structured clusters of roles . . . . The important defining features of social structure are that interaction is selective, regularized, and regulated by various social controls. (111, p. 27)

Smelser distinguished three basic concepts for analyzing social structures:

> 1) Values refer to beliefs that legitimize the existence and importance of specific social structures and the kinds of behavior that transpire in social structures . . . 2) norms refer

> to standards of conduct that regulate the interaction among individuals in social structures . . . 3) sanctions--including both rewards and deprivations--refer to the use of various social resources to control the behavior of personnel in social structures. (111, p. 27)

Parsons deems the structure of an organization can be described and analyzed from two points of view both of which are necessary for completeness:

> The first is the 'cultural-institutional' point of view which uses the values of the system and their institutionalization in different functional contexts as its point of departure; the second is the 'group' or 'role' point of view which takes suborganizations and the roles of individuals participating in the functioning of the organization as its point of departure. (88a, p. 67)

Loomis and Parsons have conceptual frameworks of social systems which are frequently used as points of reference by sociologists. For Loomis:

> The social system is composed of the patterned interaction of members. It is constituted of the interaction of a plurality of individual actors whose relations to each other are mutually oriented through the definition and mediation of a pattern of structured and shared symbols and expectations. (68, p. 4)

While it is recognized that social systems are composed of individuals, the patterning of relationships are the important attributes of the system. In some social systems, the patterned interaction is very distinct, highly structured and persistent while in others it is less distinct, less structured and more transient. As stated by Loomis, "Any level of interaction furnishes examples of social systems: the direct, face-to-face, personal interaction of two actors, or the indirect, enormously interlinked, impersonal interaction of a society" (68, p. 4).

In the development of his analytical framework of social system, Loomis uses three sets of concepts: 1) specific social system elements, 2) master processes, and 3) conditions of social actions.

Loomis delineates nine specific elements of social systems: 1) belief (knowledge) -- any proposition about the universe which is thought to be true; 2) sentiment -- feeling about phenomena; 3) end, goal or objective -- change which members of a social system expect to accomplish through appropriate interaction; 4) norm -- the standards which prescribe what is acceptable or unacceptable; 5) status-role -- that which is to be expected from an incumbent of any social position; 6) power -- capacity to control others; 7) rank-power -- the value an actor has for the system in which the rank is accorded; 8) sanctions -- rewards or penalties meted out by members of the system to attain conformity to its ends and norms; and 9) facility -- means used by the system to attain its ends. The two-term entity, status-role, contains the concept of status, a structural element implying position and the concept role, a functional position. The concept of power used by Loomis has two major forms--authority and influence. Authority is defined as the right, as determined by the system, to control the actions of others. Influence may be regarded as control over others which is of non-authoritative nature (68, pp. 11-30).

Loomis sets forth six comprehensive or master processes: 1) communication -- the process by which information, decisions and directives pass through the system and provide data upon which beliefs are gained and sentiments are formed or modified; 2) boundary maintenance -- the process by which the social system retains its solidarity, identity and interaction patterns; 3) systemic linkage -- the process whereby the elements of at least two social systems come to be articulated so that in some ways they function as a single system; 4) socialization -- the process whereby social and cultural heritage is transmitted; 5) social control -- the process by which deviation is counteracted; and 6) institutionalization -- the process whereby human behavior is made predictable and patterned and social systems are given the elements of structure and the processes of function (68, pp. 30-36).

The three conditions of social action delineated by Loomis are: 1) territoriality -- the setting of the social system in space, 2) time and 3) size (68, pp. 37-38).

Also, Loomis differentiates, for analytical purposes, between the external pattern and internal pattern of a social system. An external pattern is:

> A pattern of interaction which displays the relations necessary for the group's adjustment to its environment and for the attainment of its goals. (68, p. 40)
>
> The internal pattern is a pattern of interaction which consists of those relations that focus upon the expression of sentiments of system members toward one another. (68, p. 42)

Parsons has been a leading exponent of the concept, social systems. Parsons has applied his general theory of the social system to formal organizations. Society is often used as his point of reference, however, frequent reference is made to the business firm. His discussion of formal organizations, including the business firm, and his differentiation of three hierarchial levels of structural organization in the formal organization, appear to make it appropriate to briefly discuss his conceptualization of social systems. His discussion in relation to formal organizations and to the business firm will be presented following a discussion of formal organizations in general.

The social system according to Parsons:

> . . . consists in a plurality of individual actors interacting with each other in a situation which has at least a physical or environmental aspect, actors who are motivated in terms of a tendency to the 'optimization of gratification' and whose relations to their situations, including each other, is defined and mediated in terms of a system of culturally structured and shared symbols. (87, pp. 5-6)

In later writings with Smelser, it is pointed out that the social system is not made up of "the total action of concrete persons and collectivities, but only their actions in specific roles" (91, p. 21). In his general action theory, three additional systems are included: biological system, personality system and cultural system. There is a high level of interrelatedness and interpenetration of the social system by the other systems.

For Parsons, the value pattern of a social system is the main point of reference for analyzing its structure. The value pattern " . . . defines the basic orientation of the system . . . to the situation in which it operates; hence it guides the activities of participant individuals" (88a, p. 67).

> Since it has been assumed that an organization is defined by the primacy of a type of goal, the focus of its value system must be legitimation of this goal in terms of the functional significance of its attainment for the superordinate system, and secondly the legitimation of the primacy of this goal over other possible interests and values of the organization and its members. Thus the value system of a business firm in our society is a version of 'economic rationality' which legitimizes the goal of economic production (specified to the requisite level of concreteness in terms of particular goods and

> services). Devotion of the organization (and hence the resources it controls) to production is legitimized as is the maintenance of the primacy of this goal over other functional interests which may arise within the organization. (88a, p. 68)

In his general theoretical framework for the study of social systems, Parsons views social systems as structurally differentiated about two major axes. The first dichotomized axis is designated as the external-internal axis. The external referring to relations between the system and the situation external to the system. The internal referring to interrelationships of units. This distinction as noted by Parsons is similar to that employed by Homans (53). Activity is considered consummatory when the activity or its product per se represents goal attainment. The second dichotomized axis is differentiated as instrumental-consummatory. The instrumental-consummatory differentiation is analogous to the differentiation between mean and ends of action.

> These two axes must be considered, not as continua, but as qualitatively differentiated reference categories, however much they may shade into each other. Four main functional problems or dimensions of system structure and process may be derived from these axes: (1) the external-consummatory reference which I called 'goal-attainment'; (2) the external-instrumental reference which I have elsewhere called 'adaption'; (3) the internal-consummatory reference which I have called 'integration'; and, finally, (4) the internal-instrumental reference which I have called pattern-maintenance and'tension-management.' (86, p. 6)

Every social system has the problem of procuring and of mobilizing resources which concerns the external relations of the system to its environment. The social system must adapt to the situation in which it operates by adjusting demands or by actively transforming the environment. Every social system has one or more goals and attempts to attain this objective through cooperative effort in the mobilization and allocation of resources. Integration includes establishing and organizing the interrelations of the member units of the system to coordinate and to unify them. The social system's motivational and cultural patterns must be maintained over time. The four main functional problems are faced by every social system and must be performed by every social system.

Parson's general theoretical framework has sufficient generality to be applicable to social systems at all levels. A social system may be perceived at many differentiated levels ranging from the personal interaction of two individuals up to the impersonal interaction of society. As a social system, society has these four functional problems. The reference used in the following discussion is in regard to primacy, because " . . . every organization contributes in some way to every primary function" (88b, p. 228). Also no one of the primary functions is performed by any one concrete structure alone. From a societal viewpoint, the economy is the subsystem which deals with the adaptive problem of society. The family is primary in pattern maintenance and tension management. Churches, schools, the arts and kinship groups are included in the category of pattern maintenance and tension management. The goal attainment subsystem of society "the polity" is centered with government, banking and corporate aspect of organizations. Placed in the integrative classification are courts, hospitals, political parties and legal professions. Each of the functional subsystems of a society can be viewed as a social system with its own four basic functional problems. In one writing, Parsons and Smelser look at the economy as a social system and view its interchanges with the other three subsystems (91).

Loomis and Loomis present a detailed and systematic comparison of the concepts and conclusions of the two conceptual schemes (69). Similarities and differences are determined as Parsons' work and Loomis' "Processually Articulated Structural Model" are juxtaposed. Loomis found Parsons' work amendable to analysis by his model.

> . . . Parsons' influence on the PAS Model will be easily detected at the same time that the model itself differs substantially from the central core of his conceptual scheme, the nature of his extensive contributions and the direction of their development. (69, p. 354)

Because both of these frameworks follow a structure--function approach, four additional concepts will be mentioned--manifest functions, latent functions, functions and dysfunctions. Merton will be cited for definitions of these concepts.

> Functions are those observed consequences which make for the adaption or adjustment of a given system; and dysfunctions, those observed consequences which lessen the adaption or adjustment of the system. There is also the empirical possibility of nonfunctional consequences, which are simply irrelevant to the system under consideration. (80, p. 51)

> Manifest functions are those subjective consequences contributing to the adjustment or adaption of the system which are intended and recognized by participants in the system. (80, p. 51)

> Latent functions, correlatively, being those which are neither intended nor recognized. (80, p. 51)

There are many types of social systems. Various criteria can be used in classifying and naming social systems. In this study, the major concern is with the business firm which is a special type of social system. Also, the business firm is a special type of formal organization (social system) which is a more general type of social system than the business firm. These social systems will be discussed to provide insights about the role of the general managers in a local retail farm supply business.

Formal Organizations

Approach

Social systems may be classified by different criteria. One way would be by functional categories such as institutional, formal voluntary, informal, locality and agency. Another way would be by basic function such as economic, religious, educational, political and familial. Another approach would be to look at society as a social system in which one can distinguish subsystems and sub-subsystems, all of which are considered social systems. In distinguishing levels of system for the economy, Johnson states:

> The economy, it will be remembered, is conceived as one of four functional subsystems of society - specifically, the subsystem that fulfills more or less adequately, the adaptive function of society. All four functions must be performed in every social system, whatever its scope and level of concreteness. We can distinguish at least six system levels: (1) the society itself, (2) a functional subsystem of society (e.g., the economy), (3) a functional sub-subsystem (e.g., the investment-capitalization system - the adaptive system of the economy), (4) a functional sybsystem at the next lower level (e.g., the adaptive subsystem of the investment-capitalization subsystem, concerned with the procurement of facilities), (5) an industry (e.g., the steel industry), and (6) a particular concrete organization (e.g., a firm or a plant). (56, p. 214)

As well as being viewed as a special type of social system, the business firm can be viewed as a formal organization to which general principles about organizations apply. In this study, the formal organization will be viewed as a special type of social system.

The basic approach of this section will be to discuss the major characteristics of formal organizations which distinguish them from the other social systems. This approach will not be highly integrated or cover all the concepts, propositions and hypotheses about organizations but will merely provide a background for the analysis of changes resulting from a training program for general managers of retail farm supply businesses.

To place the social system approach to formal organization in the proper perspective, articles by Scott (99) and Gouldner (44) on the review and appraisal of organization theory will be briefly summarized. Scott discusses organization theory in general whereas Gouldner concentrates on the work carried out by sociologists. This will assist in placing the present approach in the proper perspective and also provide a background for discussion of business firms. This will be followed by a discussion of distinguishing characteristics of formal organizations. Next, the works of Talcott Parsons will be very briefly reviewed. His works are relevant to this study because 1) his conceptualization of social systems which is applicable to these systems at all levels has been briefly presented, 2) he has applied his conceptual framework of social systems to formal organizations, and 3) his differentiation of decision making is similar to the one to be employed in measuring the impact of the training program on the manager as well as his business firm.

Diversity of views about formal organizations

Scott in a review and an appraisal of the various approaches to theory of organizations lists three general classifications--classical doctrine, neoclassical theory and modern organization theory (99). According to Scott, the four key pillars of classical organization theory are division of labor, scalar and functional processes, structure and span of control. "The scalar process refers to the growth of the chain of command, the delegation of authority and responsibility, unity of command and the obligation to report" (99, p. 15). The function process " . . . focuses on the horizontal evolution of the line and staff in a formal organization" (99, p. 15).

In classical writings, some of the concepts frequently used, but not mentioned above, are objectives, tasks, rational behavior, coordination of effort and efficiency, line and staff. According to Scott:

> The neoclassical approach to organization theory gives evidence to accepting classical doctrine, but superimposing on it modifications resulting from individual behavior, and the influence of the informal group. (99, pp. 15-16)

This approach is often associated with the human relations movement. Some of the major contributions of this approach have been the modification of the classical doctrine pillars, how the pillars of the classical doctrine are affected by human actions, systematic treatment of the informal organization and the introduction of behavioral sciences into organization theory. Modern organization theory views the organization as a system. In discussing modern organization theory, Scott states:

> The distinctive qualities of modern organization theory are its conceptual-analytical base, its reliance on empirical research data and, above all, its integrating nature. These qualities are framed in a philosophy which accepts the premise that the only meaningful way to study organization is to study it as a system. . . . Modern organization theory asks a range of interrelated questions which are not seriously considered by the two other theories.
>
> Key among these questions are: (1) what are the strategic parts of the system? (2) what is the nature of their mutual dependency? (3) what are the main processes in the system which link the parts together and facilitate their adjustment to each other? (4) what are the goals sought by systems? (99, p. 19)

Scott lists the ingredients involved in system analysis as the parts, the interactions, the processes and the goals of the system. The parts are delineated by Scott as the individual and the personality structure he brings to the organization, formal organization, informal organization, status and role patterns and physical setting. A set of processes link the parts. Those mentioned by Scott are communication, balance and decision making. For Scott, "Balance refers to an equilibrating mechanism whereby the various parts of the system are maintained in a harmoniously structured relationship to each other" (99, p. 21). In his discussion of goals of organizations, Scott lists three goals--growth, stability and interaction--which may be intermeshed or independent ends in themselves. For Scott, interaction in the goal framework " . . . refers to organizations which exist primarily to provide a medium for association of its members with others" (99, p. 22). In his article, Scott also compares modern organization theory with general system theory. A relevant remark by Scott is applicable to this analysis where an eclectic approach is being used.

> The irony of it all is that a field dealing with systems has, indeed, little system. Modern organization theory needs a framework, and it needs an integration of issues into a common conception of organization. (99, p. 25)

In his discussion of the major problem of organizational analysis, Gouldner dichotomizes the development of organizational analysis into two basic approaches. He outlines the nature of the problem by stating:

> During the historical development of organizational analysis, two distinct approaches to the study of complex organizations have emerged in the work of sociologists. One of these, best exemplified by the work of Max Weber, is a conception of the organization in terms of a 'rational' model. The other, which can be termed the 'natural system' model, ultimately derives from Compte, was later reinforced by Robert Michels, and is now best exemplified in the work of Philip Selznick and Talcott Parsons. (44, p. 404)

Because of the divergent implications of the two approaches, Gouldner feels a major contribution would be the synthesis of these models because certain problems of organizations could be more adequately analyzed with this synthesized model. Gouldner states:

> What is needed is a single and synthesized model which will at once aid in analyzing the distinctive characteristics of the modern organization as a rational bureaucracy, the characteristics which it shares with other kinds of social systems, and the relationships of these characteristics to one another. (44, p. 426)

Gouldner discusses the advantages and limitations of each of the two models as well as discussing some organizational problems more adequately analyzed by a synthesized model.

Gouldner describes both the rational and natural models:

> In the rational model, the organization is conceived as an 'instrument'--that is, as a rationally conceived means to the realization of expressly announced group goals. Its structures are understood as tools deliberately established for the efficient realization of these group purposes.

> Organizational behavior is thus viewed as consciously and rationally administered, and changes in organizational patterns are viewed as planned devices to improve the level of efficiency. The rational model assumes that decisions are made on the basis of a rational survey of the situation, utilizing certified knowledge, with a deliberate orientation to an expressly codified legal apparatus. (44, p. 404).
>
> The natural-system model regards the organization as a 'natural whole,' or system. The realization of the goals of the system as a whole is but one of the several important needs to which the organization is oriented. Its component structures are seen as emergent institutions, which can be understood only in relation to the diverse needs of the total system. The organization . . . strives to survive and to maintain its equilibrium . . . .
>
> Organizational structures are viewed as spontaneously and homeostatically maintained. Changes in organizational patterns are considered as the results of cumulative, unplanned, adaptive responses to threats to the equilibrium of the system as a whole. (44, p. 405)

He suggests that the rational model focuses attention on the patterns which distinguish organizations; however, it neglects the manner in which the characteristics held in common with other social systems affect behavior with organizations.

Because the discussion of this section will draw mainly on writers using the system approach, Gouldner's delineation of the aspects which the system model neglects or minimizes follows: 1) the significance of rationally organized structures for planned growth and adaptation; 2) the importance of formalized codes, division of labor, reliance on professional and technical experts and rationalistic orientations on growth; 3) role of rationality in human affairs; 4) study of organizational constraints that are conducive to the realization of democratic values; and 5) the significant variations in degrees of interdependence among parts (44, pp. 406-419). According to Gouldner, one of the most important contributions of the natural-system model is the discovery and analysis of "informal organization."

The contributions to an ultimate theory about organizations are coming from many diverse fields. Some of these fields include management science, operations research, psychology, anthropology, sociology, political science, social psychology, mathematics, economics, statistics and management itself.

People in all of these fields are conducting research about organizations, or some aspects of behavior in organizations, or organization activities. However, at the present time an integrated or unified theory does not exist which could be used to generate hypotheses about management.

Distinguishing characteristics

There are several theoretical treatments of formal organizations and an abundance of literature on specific aspects of formal organizations. As noted in the preceding discussion, there are several schools of thought and the study of organizations has been approached from many different viewpoints. As pointed out earlier, the central emphasis of this study is on the general manager in the local retail farm supply firm and the impact of his management on selected activities of and outcomes for that firm. If the firm was the basic unit of analysis rather than selected aspects, a much more detailed discussion of formal organizations would be warranted. In the present study, the primary purpose of the presentation is to describe the environment of the manager and his firm and to provide a framework for the analysis of selected variables concerning his behavior and firm activities and outcomes. If the firm per se was the unit of analysis, some of the relevant additional writings would include those by Argyris (5,6), Barnard (7), Blau (22), Blau and Scott (23), Cyert and March (31, 32), Gouldner (44,45), Haire (47), Homans (53), Merton (79,80), Selznick (100,101,102,103), Simon (107,108,109), March and Simon (71), Presthus (96), Weber (39, 129) just to mention a few. Because of the orientation of this analysis, these works will not be summarized, reviewed, or evaluated. However, certain generalizations, propositions, or insights of these works will be drawn upon in discussing the distinguishing characteristics of formal organizations.

Within the context just outlined, the intent of this section is to isolate some of the major characteristics which distinguish formal organizations from other social systems not to discuss all characteristics of formal organizations. The methods selected to isolate major characteristics are 1) by ideal type, 2) by definition, and 3) by discussion of goals, formal structure, and informal structure.

Ideal type   Weber's classical theories of authority and of bureaucratic organization have had a profound influence on subsequent theoretical conceptions about formal organizations. The ideal type of formal organization is bureaucracy. One of the classical conceptualizations of bureaucracy is that developed by Weber. The purpose of this discussion is not to summarize or evaluate his work but to point out some of the relevant distinguishing characteristics mentioned in his work. Weber's classical analysis of bureaucracy consists of a conceptual scheme to identify the most characteristic features of bureaucracy and a set of hypotheses. Weber distinguished authority from other forms of social influence. Power is defined by Weber as "the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance" (129, p. 152). Authority is distinguished by defining it as "the probability that certain specific commands (or all commands) from a given source will be obeyed by a given group of persons" (129, p. 324). The commands are voluntarily followed because of the belief by members that it is legitimate for this source to issue them. Weber distinguishes three types of authority: 1) traditional, 2) charismatic, and 3) legal (39). Legitimacy of the traditional rests upon tradition and upon a belief in the sacredness of traditionalistic type laws or precedents. Charismatic type authority places major emphasis upon unique and/or unusual qualities of the individual and purpose. Legitimacy of the legal authority rests upon a belief in supremacy of the law. Emphasis is placed on the position rather than on the person who holds the position. The holder of the position claims obedience on the ground that his commands fall within a formally established, impersonal body of social norms (laws). The pure type of legal authority is best represented in the pure type of formal organization--bureaucracy. In a bureaucracy the official's role consists of formally established and defined duties along with a defined sphere of authority. The authority of an official rests in his position and is defined and limited.

Some of the characteristics of bureaucracy delineated by Weber are: 1) bureaucracy involves a division of activities which are distributed among the various positions as official duties inherent in the office; 2) there is a hierarchical authority structure of the offices (positions); 3) official decisions and actions are governed by a system of rules, regulations stated in written documents; 4) technical qualifications are the basis for employment and these qualifications are ascertained by formalized procedures such as examinations; 5) the bureaucratic official is appointed not elected;

6) employment of the official in a bureaucratic office constitutes a career for the office holder; and 7) the bureaucratic official is expected to assume impersonal orientation in his relations with other officials and with clients of the organization (39, pp. 196-204).

Definition Definitions of formal organizations usually include at least two additional concepts to those of social systems. The organizations are planned or established to accomplish a certain goal(s) or purpose. In distinguishing formal organizations from other types of social organization, Blau and Scott state:

> . . . there are organizations that have been deliberately established for a certain purpose . . . . In these cases, the goals to be achieved, the rules the members of the organization are expected to follow, and the status structure that defines the relations between them (the organizational chart) have not spontaneously emerged in the course of social interaction but have been consciously designed a priori to anticipate and guide interaction and activities. Since the distinctive characteristic of these organizations is that they have been formally established for the explicit purpose of achieving certain goals, the term 'formal' organizations is used to designate them. (23, p. 5)

Weber focused upon the formation and characteristics of the rational structures. Barnard focuses more on the non-rational aspects stressing cooperative aspects. For Barnard, the organization is a formally organized cooperative system. The formal organization is defined by Barnard as "a system of consciously coordinated activities or forces of two or more persons" (7, p. 73). Barnard states three elements which are necessary and sufficient conditions for organizations to be formed. These elements are found in all formal organizations. "An organization comes into being when 1) there are persons able to communicate with each other 2) who are willing to contribute action 3) to accomplish a common purpose" (7, p. 82). Barnard points out that either effectiveness or efficiency is necessary for the organization to continue existence and the longer the existence the more necessary both are. Selznick, in viewing formal organization, places emphasis on both the formal and informal relations. He views organizations as economic and adaptive structures but also as cooperative systems. The organization is an economic system in that "the organization is a system of relationships which define the availability of scarce resources and which may be manipulated in terms of efficiency and effectiveness" (101, p. 26). This area often commands the attention in studies of organizations; however, other factors make it important to view the organization as a cooperative system. "The indivisibility of control and consent makes it necessary to view formal organizations as cooperative systems . . ." (101, p. 27). Individuals participate in organizations not only in their formal roles but as total personalities. This leads him to examine informal relations and the interchange between the individual and organizations.

Following the system approach, Simon states:

> Human organizations are systems of interdependent activity, encompassing at least several primary groups and usually characterized, at the level of consciousness of participants, by a high degree of rational direction of behavior toward ends that are objects of common acknowledgment and expectation. (108, p. 1130)

Presthus, in his article on organizational behavior, stresses the importance of certain psychological formulations in understanding human behavior in organizations.

> . . . some psychological formulations are brought to bear upon two major variables, the total organizational situation and the individual. (96, p. 49)

He points out the usefulness of this framework is due to " . . . the complexity of organizational behavior, which is the product of interaction among the whole culture, a given organization, and an individual personality . . ." (96, p. 49). He discusses individual accommodation to the organization. Presthus, defines organization as:

> . . . Organization is defined as a system of structural interpersonal relations . . . individuals are differentiated in terms of authority, status, and role with the result that personal interaction is prescribed . . . . Anticipated reactions tend to occur, while ambiguity and spontaneity are decreased. It is hypothesized that the resultant psychological field has exceptional influence upon learning and accommodation to the system. (96, p. 50)

He points out the importance of learning theory to understanding human behavior in organizations, " . . . because individual accommodation to the organization is essentially a matter of learning" (96, p. 54).

In his discussion of personality and bureaucracy, Merton outlines some characteristics of formal organizations:

> A formal, rationally organized social structure involves clearly defined patterns of activity in which, ideally, every series of actions is functionally related to the purposes of the organization. In such an organization there is integrated a series of offices, of hierarchized statuses, in which inhere a number of obligations and privileges closely defined by limited and specific rules. Each of these offices contains an area of imputed competence and responsibility. Authority, the power of control which derives from an acknowledged status, inheres in the office and not in the particular person who performs the official role. Official action ordinarily occurs within the framework of pre-existing rules of the organization. The system of prescribed relations between the various offices involves a considerable degree of formality and clearly defined social distance between the occupants of these positions. . . . Ready calculability of others' behavior and a stable set of mutual expectations is thus built up. (80, p. 195)

Most of the above definitions define organization as a system. The definitions point out that the social structure was "established," "planned," "organized," "structured." The organization was established for "a certain purpose," "to accomplish a common purpose," "toward ends." Also, pointed out in the above discussion was the informal relations in formal organization. The following discussion will center on three aspects of formal organizations--goals, formal structure and informal structure.

Goals, formal structure, and informal structure From the preceding discussion, one of the major distinctions between formal and informal groups is made on the basis that at the time of origin the formal group and its structure were created and organized to achieve specific goal(s). Three important aspects are important in this distinction: 1) the organization was deliberately established and 2) the formal structure was consciously planned 3) for the purpose to achieve certain goals. The social system did not just arise from the social interaction of individuals but was organized and planned to help achieve certain goals. Over time, the social structure and the goals of the formal organization are a result of internal and external influences. Present in every organization which has some duration are formal and informal relations among the individuals in the organization as well as formal and informal structures. Although the distinction between formal and informal is relative, informal groups are social systems which emerge from the interaction of individuals. Although bearing on goal attainment, they were not deliberately created or organized for specific ends. The informal social structure was not deliberately or consciously created or planned. This discussion of formal organizations will center on goals, formal structure and informal structure.

Goals While attention has been called to the primacy of goal attainment for the formal organization, this does not imply the organization has only one goal or all individuals and subsystems in the formal organization have the same goal(s) as the organization. Also, some writers point out that an organization cannot have goals; only individuals have goals. Their argument is that to imply organization goals touches upon untenable "group mind." Johnson points out the context within which organization goals are used in this study:

> It is true that the participants in an organization have a variety of personal goals; it is also true that their conceptions of the group goals may not be exactly alike . . . . Yet the concept of organization is meaningless unless there is a significant amount of agreement about the common objectives of cooperation. 'Organization' . . . implies some coordination of activities, and 'coordination' implies orientation to common goals, specialization of contributions to the common effort, and some form of command or leadership. To the extent that individuals have a place in a 'table of organization' and are geared into a plan of the organization's activities, the organization may be said to have goals. (56, p. 281)

The organization provides a means of goal attainment. Because of the goal-directedness of the formal organization, goals have a profound influence on the characteristics of the organization. In fact, goal primacy is the basic reason for the existence and continued existence of the formal organization. The social structure was deliberately and consciously planned to accomplish certain objectives. Goals and environment have an influence on the structure and activities of the formal organization. Based on data obtained by a mail questionnaire survey of voluntary associations, Simpson and Gully state: "On a more general level, the findings seem to support the proposition that the characteristics of organizations will be systemically related to their goals and to environmental circumstances in which they operate" (110, p. 350). Goals may be modified or changed as a result of adaptation of the social system to its environment. Adaptation for a social system is a two way process, "A social system must adapt the environment to its goals and must adapt its goals to the environment" (56, p. 284). Changes may be made in the social structure of the social system in adapting its goals to the environment.

The organization is a means of accomplishing a multiplicity of goals which can be arranged hierarchically by various criteria. Individuals and social systems within the organization may have different goals than the organization. Therefore, the organization may be viewed as a means of accomplishing a multiplicity of goals for the organization, individuals and social systems within the organization. The important aspect is not that the goals of individuals and subsystems within the organization are similar but that they are functionally related (67). Differences between individual social systems within the organization and organization goals arise from several sources. Some of these sources of differences include social and personal differences in individuals, imperfections in the communication system, the lack of integration and incongruencies between individual needs and organization demands.

Goals may be stated at different levels of abstractness. A distinction between official and operative goals is made by Perrow (93). He argues that in understanding organizational behavior, it is more relevant to study operative goals than official goals. He states:

> Official goals are the general purposes of the organization as put forth in the charter, annual reports, public statements by key executives and other authoritative pronouncements. (93, p. 855)

The official goals are general and do not tell what the organization is actually trying to do. Whereas,"operative goals designate the ends sought through the actual operating policies of the organization . . ." (93, p. 855). The following is an example given by Perrow to distinguish between the two:

> . . . where profit-making is the announced goal, operative goals will specify whether quality or quantity is to be emphasized, whether profits are to be short run and risky or long run and stable, and will indicate the relative priority of diverse and somewhat conflicting ends of customer service,

> employee morale, competitive pricing, diversification, or liquidity. (93, p. 855)

Goals of the organization may be stated at various degrees of specificity. Regardless of level, goals have an influence on the characteristics and activities of the organization. Goal attainment is always a matter of degree. The degree of goal attainment may be a measure of the effectiveness of the organization.

Formal structure Structure may be viewed as the manner of organizing or, in other terms, the arrangement or interrelation of all the parts of a whole. Social structure as defined by Smelser, " . . . is a concept used to characterize recurrent and regularized interaction among two or more persons" (111, p. 27). Johnson includes in the structure of a social system: ". . . subgroups of various types, interconnected by relational norms; roles of various types . . ., regulative norms governing subgroups and roles; and cultural values" (56, p. 51). Those aspects of social structure of the formal organization which have been (or possibly might be) deliberately and consciously planned or organized will be considered formal.

A conscious plan or system of roles, objectives, work specifications, official statements, etc. in formal organization specify and define aspects of the formal organization such as division of labor, tasks, authority spheres, procedures for role occupants, positions, certain interrelationships among the elements of the formal organization and certain sanctions to mention a few. Much of the classical school of thought deals with this aspect with concepts such as objectives, tasks, rational behavior, division of labor, span of control, chain of command, delegation of authority and responsibility, line and staff, coordination and leadership. As pointed out by the Scott article, the neoclassical school modified some of the thought concerning these aspects of formal organization. An important point for the present study is that the formal aspects of the organization provide some of the areas which management can control most directly. These are the aspects of organization which have been or might be consciously planned and organized.

Probably one of the more obvious aspects of the formal organization is the division of labor among individuals and subsystems in the organization.

This is usually done by a definite plan or system which allows for specialization of efforts of individuals and subsystems with the objective of improving the efficiency of the organization. A hierarchy is formed within which authority and responsibility are delegated. With specialization comes the problem of integrating the activities of the various individuals and subsystems for the purpose of achieving the goals or organization. Communication and control are important in coordinating the efforts of the individuals and subsystem toward the common goals. Both formal (channeled) communication and informal communication are important in the coordination of activities and efforts. Communication is channeled to the extent that procedures and rules outline official paths which are to be followed in giving and obtaining information, making requests and issuing commands and directives. Planning, organizing, directing, coordinating and controlling are the classical concepts in management. This will be dealt with in the section on management in the retail firm. These basic functions of management are usually viewed as occurring in all levels of organization ranging from the very small retail store to the large, complex company with thousands of employees. The subsystems within the large organizations are believed to have these same activities. Managers in these subsystems, such as the production department or sale departments, have these same functions or areas of management.

Informal structure In formal organizations with some duration, formal relations and informal relations as well as formal structure and informal structure are present. The informal structure will be viewed as those aspects of the formal organization which emerge from the interaction of individuals participating in the organization. The informal structure includes the informal relations and the informal groups which develop and perpetuate through contacts of individuals with each other. Within the context developed in this study, these aspects of the formal organizations were not deliberately or consciously planned or organized but emerged from the interactions of the individuals and groups within the organization. In the formal organizations, these informal relations and groups tend to be formed when individuals relate themselves to each other as total personalities rather than according to their formalized roles. Blau and Scott discuss formation of informal relationships by stating:

> Regardless of the time and effort devoted by management to designing a rational organization chart and elaborate procedure manuals, this official plan can never completely determine the conduct and social relations of the organization's members. . . . In every formal organization there arise informal organizations. The constituent groups of the organization, like all groups, develop their own practice, values, norms, and social relations as their members live and work together. The roots of these informal systems are embedded in the formal organization itself and nurtured by the very formality of its arrangements. (23, pp. 5-6)

In his analysis of formal organization, Argyris sets forth essentially the thesis that incongruencies (there is inevitable conflict) between organization demands and the "personality" or individual needs and that informal relationships develop as a necessary means for meeting the personal needs denied by the formal organization (6).

Many reasons are often cited for the development of informal relationships. Some of the major ones are: 1) the generality of the formal rules and statements, i.e., they are not specific enough to cover specific cases, 2) interests and problems of a personal nature, 3) situations arise which are not covered by the formal rules and statements, 4) the impersonality of the formal system, 5) the lag in the formal system because of its inability to "keep up" with an everchanging environment, and 6) influence of factors which can not be included in a formal system such as individual characteristics, unanticipated changes, individual interests and individuals are members of many other groups.

In his discussion of increasing knowledge about informal organization, Litterer states:

> It has been learned that informal organizations have a structure which has spontaneously arisen, that it has its own rules, usually called norms, for guiding the behavior of its members, and that it has its leaders and its followers. It, too, has its objectives, or perhaps more accurately functions, which it serves. With this knowledge has come the realization that informal organizations are a necessary, vital part of human life and constitute an integral part of a total organization. (67, p. 11)

From the social systems approach, informal groups can be viewed as social systems characterized by all the properties which are essential and necessary to any social system. Informal groups are often referred to as primary groups and the formal groups are referred to as secondary groups. In comparing formal and informal groups, a distinction could be made in social structure. The social structure of the informal group is usually much less formalized. Again the difference is a matter of degree. Interactions between individuals are more on a personal, face-to-face basis with relationships based on the individual as a whole rather than just a formalized role (a segment). Briefly, then, relationships in informal groups are more direct, more frequent and more personal. These groups in society are very important in the process of socialization, satisfactions of individual needs, value and attitude formation and change.

Informal relations may be either functional or dysfunctional as far as they influence goal attainment of the formal organization. They may be functional from the standpoint of aiding communication, improving morale, assisting in the socialization of the individual to the organization, assisting in social control, etc. From an organizational standpoint, they may hinder the fulfillment of certain organization goals by such activities as setting production standards other than those specified by the formal structure, setting conflicting goals, etc.

The formal structure has an impact on the informal structure as well as the informal having an influence on the formal. Adjustments occur in the formal to accommodate the informal and adjustments occur in the informal to accommodate the formal.

The organization must adapt to its environment. The organization is influenced by availability of technology and resources as well as the general economic, political and social conditions of the society. An individual entering an organization has both the formal structure and informal structure to consider. Guides for his behavior as well as rewards and punishments are provided by both the formal structure and informal structure. If these are different and conflicting then the individual is faced with dilemmas and the adjustment is more difficult. A comprehensive theory of formal organizations would need to deal with the individual, the formal structure and the informal structure and their interrelationships which make up the total organization as well as the organization's adaptation and adjustment to its environment including the availability of resources and technology and general economic, political and social conditions of the society.

In general, some of the major distinguishing characteristics of formal organizations which differentiate them from other types of social systems are:

1. Primacy on goal attainment.
2. Formalized and institutionalized social structures which have been planned and organized.
3. An elaborate division of labor.
4. Specialization of positions and tasks.
5. Action and activities are highly regulated, integrated and coordinated.
6. Decisions are made by specified authority in a highly organized chain of command.
7. Individuals are recruited on the basis of qualifications and specialized training.
8. Distinction is made between the private affairs of the incumbent of a position and his official duties and responsibilities.
9. A series of positions with hierarchized statuses.
10. Authority derives from the position rather than particular incumbent of a position.
11. Prescribed relations carry a considerable degree of formality.
12. In formal organization informal structure emerge.

Parsons' Approach to Formal Organizations

The business firm, like all formal organizations, is a social system and faces four problems. It must adapt to its environment and procedure and mobilize resources (adaptation). The organization must allocate and coordinate available resources for the attainment of its goals (goal attainment). It must promote consensus on values which legitimize its goals along with furnishing, maintaining and renewing the motivational and cultural patterns. Anxiety must be relieved and encouragement provided. (Pattern maintenance and tension management). In the integrative, the problem is to regulate interrelationships and promote harmonious interaction among the units to command member loyalty, to motivate members and to obtain solidarity, coordination, cooperation, efficiency and internal integration. All organizations have these basic functional problems; however, the particular differentiated structures that meet these problems will vary from one organization to another. Also, not any of the functions is performed by any one concrete structure alone (91, p. 197).

> As a formal analytical point of reference, primacy of orientation to the attainment of a specific goal is used as the defining characteristic of an organization which distinguishes it from other types of social systems . . . An organization is a system which, as the attainment of its goal, 'produces' an identifiable something which can be utilized in some way by another system; that is, the output of the organization is, for some other system, an input. In the case of an organization with economic primacy, this output may be a class of goods or services which are either consumable or serve as instruments for a further phase of the production process by other organizations. (88a, pp. 64-65)

> It is thus assumed that in the case of all organizations there is something analogous to a 'market' for the output which constitutes the attainment of its goal . . . and that directly, and perhaps also indirectly, there is some kind of exchange of this for entities which (as inputs into it) are important means for the organization to carry out its function in the larger system. (88a, p. 65)

> . . . treatment of the organization as a social system. First, it will be treated as a system which is characterized by all the properties which are essential to any social system. Secondly, it will be treated as a functionally differentiated subsystem of a larger social system. Hence it will be the other subsystems of the larger one which constitute the situation or environment in which the organization operates. An organization, then will be analyzed as the special type of social system organized about the primacy of interest in the attainment of a particular type of system goal. Certain of its special features will derive from goal-primacy in general and others from the primacy of the particular type of goal. Finally, the characteristics of the organization will be defined by the kind of situation in which it has to operate, which will consist of the relations obtaining between it and the other specialized subsystems of the larger system of which it is a part. The latter can for most purposes be assumed to be a society. (88a, pp. 66-67)

According to Parsons, the formal organization exhibits three major hierarchical activity levels (88a,88b,89). Each level is responsible to the organization for its own function in much the same way the organization is responsible to a larger system. The first organizational level is the technical level. At this level, in a differentiated system, the actual "product" of the organization is manufactured or dispensed.

Parsons distinguishes four categories of technical level output:

> (1) Physical production in economic sense, i.e., of commodities; (2) administrative implementation of authoritative decisions; (3) integration of units in social systems; and (4) maintenance or creative modification of motivation or cultural components of the social systems (properties of units). (86, p. 11)

Above the technical level is the managerial level of organization. There are three primary foci of this operation:

> The first concerns the mediation of relations to the recipients of the output of the technical organization--i.e., generally the decisions of what and how much to 'produce' and on what terms, financial and otherwise, it shall be made available to recipients . . . . The second focus is that of the 'procurement' of facilities necessary for performing the function--e.g., materials, equipment, and personnel . . . . Finally, the third focus is that of control and supervision of the technical or primary units of organization . . . . (86, pp. 11-12)

The third level, the institutional, connects the organization with the wider social system. The members of fiduciary boards (directors or trustees) have certain supervisory responsibilities and supportive functions with respect to the managerial level. They oversee the operations of the organization and define board limits of what the management may legitimately do and give them community support in doing it (86, p. 14).

These levels are important to the decision-making process. Decisions emerge at the various organizational levels but are always a function of the power vested at a particular level. Parsons distinguishes three types of decisions: policy, allocative and coordinative (88a, p. 9).

> By policy decisions are meant decisions which relatively directly connect the organization as a whole and which stand in relatively direct connection to its primary functions. They are decisions touching such matters as determination of the nature and quality standard of 'product' changes in the scale of operations, problems of the approach to the recipients of the product or service, and organization-wide problems of modes of internal operations. (88a, pp. 75-76)

Boards and highest level executives make these decisions. The orientation of this decision is chiefly external.

The allocative decisions are the province of the managerial level. These decisions concern how personnel, finances and facilities are distributed.

Also budget allocations are included in this area. Operating decisions are made at the technical level. Parsons suggests that there are distinct breaking points in the hierarchy of authority and decision making takes place at each level as pointed out above. Each level deals with organizational problems which are interrelated but functionally separate. Coordination decisions are less specifically attached to any one organization level. These decisions "bring the performance of sub-units and individuals more closely into line with the requirements of the organization than would otherwise be the case" (88a, p. 79). "These decisions are the operative decisions concerned with the integration of organization as a system" (88a, p. 79).

Parsons also deals with another problem of integration, " . . . the mechanisms by which the organization is integrated with other organizations and other types of collectivity in the total social system" (88a, p. 80).

> The problem concerns . . . the compatibility of the institutional patterns under which the organization operates with those of other organizations and social units, as related to the integrative exigencies of the society as a whole (or of subsystems wider than the organization in question) . . . . For example, if a given firm hires and fires on certain bases, will other firms in the same industry be allowed to follow this precedent? (88a, p. 80)

Parsons discusses three complexes of integrative patterns: contract, institutionalization of authority and universalitically defined rules or norms (88a, pp. 80-85).

> The most universalistic complex . . . sets the limits in the treatment of human beings and nonhuman resources within which the conduct of organizations must remain. The institutionalization of authority then defines more specifically how, within limits, resources may be used within the structure of the organization, while the institution of contract defines the terms on which the resources can be made available at all. (88a, p. 85)

Setting of Local Retail Firm

The essential purpose of the discussion of formal organizations was to gain a better understanding of the social system in which the general manager was a participant. Additional understanding of the general manager's role can be gained by viewing how his business firm is linked to other social systems and to larger social systems of which it is a part.

The economy was viewed as a subsystem which deals with the adaptive problem of society. In this study, the fertilizer and chemical industries will be viewed as subsystems of the larger system--economy. The business firms retailing these products will be viewed as a more specific subsystem of the industries. As discussed previously, each subsystem deals with a major functional problem of the larger system. Each of these subsystems are social systems in their own right. The retail businesses in this study are located in the rural sector of society. Some of the changes occurring in agriculture and the rural sector of society were discussed in the problem-setting chapter. From the viewpoint of linkage with other social systems, the systemic linkage with social systems making purchases from the business is an important area of study. When a family purchases farm supplies for operation of the farm business from a retail farm supply business a systemic linkage is established and the interaction of dealers and customer express this linkage.

Also, in the discussion about social systems and formal organizations, exogenous variables such as the availability of technology and resources and the general economic, political and social conditions were viewed as influencing the characteristics and activities of social systems.

The setting of the retail firm was discussed in the problem-setting chapter of this report. To summarize this discussion, the retail farm supply firm is linked to many other social systems and to larger social systems of which it is a part. The effectiveness and efficiency of the retail farm supply firm has an impact on other individuals and many other social systems. The management in these firms is faced with many problems in adjusting and adapting to an ever changing environment. With increasing specialization in farming, there has been an increasing dependence of farmers upon agribusiness for purchased products and services on the input side and nonfarm market services on the output side. For certain product lines such as fertilizer and agricultural chemicals, dealers are important sources of information for farmers.

The General Manager's Role in a Formal Organization

The general setting of the small retail farm supply firm has been discussed. The next step is to examine the role of the general manager in the firm. Gross, et al., provide a conceptual framework which provides insights at both the theoretical and empirical level (46). They state, "We have attempted to introduce the minimum number of concepts and, as much as possible, to limit consideration to those concepts which are capable of operational definitions" (46, p. 48). Their complete framework will not be presented. The essentials which assist in the specification of the general manager's role will be presented. Much of the presentation will be in the form of direct quotes, since it is believed much is lost in any attempt at paraphrasing. The reader is referred to the original writing for the complete theoretical formulation and for more details about the implications for other types of research.

An examination of various role definitions will not be presented in this writing because this has been completed in the writings of Gross, et al. From their examination of several definitions of role, they make the following generalizations:

> We feel that theoretical formulations concerned with role analysis must include these three elements--social locations, behavior, and expectations--which are common to most of the definitions of role which have been considered. The ways in which these ideas have been used in theoretical schemes, the terms used to represent them, and, perhaps most important, the problems for which they provide adequate theoretical tools are far more variable than common. As we suggested earlier, one of the problems whose investigation is essential to role analysis, but which is to a large extent precluded by many definitions of role, is the problem of role consensus. (46, p. 18)

Before the presentation of a body of concepts about roles, they deal with the problem of role consensus. It was their assumption "That the extent to which there is consensus on role definition may be an important dimension affecting the functioning of social systems, whether they are total societies or subsystems" (46, p. 5). Although role consensus will have implications for analysis of the influence of training because of its influence on social systems, it is not the central issue in this analysis. The central issue is on changes in behavior. It is realized as stated by Gross, et al. "In addition, the degree of consensus among significant role definers as perceived by an actor may be an important variable affecting his behavior" (46, p. 5). Although it is not the central issue in this analysis, the problem of role consensus arises in arriving at consensus "on what managers should do" in order to determine if the training program influences the manager's behavior in desired directions.

In the previous discussion about social systems, formal organizations and business firms, the term position has been used. It has been left mainly undefined until this time because the authors would like to use definitions proposed by Gross, *et al.*:

> The term position will be used to refer to the location of an actor or class of actors in a system of social relationships. The general idea of the social location has been represented by some authors with the term status, and by others with position. The two terms have about equal precedent. We have chosen position for this purpose because status connotes the idea of differential ranking among a set of persons or social locations, whereas the more neutral term, position, does not. (46, p. 48)

In their conceptual framework, the first topic is specification of positions.

Specification of position - relational

Gross, *et al.*, examine the relational and situational aspects of position specification. Commenting on the relational, they state:

> Whatever the implications of the label, a position cannot be completely described until all the other positions to which it is related have been specified. Of course, a complete relational specification is a limiting case with which it would be impossible to deal empirically. For a given research problem, it may be necessary to take into account only a limited set of counter positions. (46, p. 51)

The position under study is called the *focal position* and the other positions, whether in that particular social system or in other social systems, are called counter positions. "A positional sector is specified by the relationship of a focal position to a single counter position and is defined as an element of the relational specification of a position" (46, p. 52). The position of general manager in a business firm implies relationships with many other positions (multiple relationships), such as customer, board of directors member, owner of business, employee, assistant manager, supplier and general manager of another firm. In the section on the setting of the local retail farm supply business and in the problem setting chapter, the linkage of the business firm to other social systems and to larger social systems of which it is a part was discussed. The system of positions in the business firm can be viewed as one system among a number of systems both inside and outside the community. In addition to those positions in the business firm for which relationships would be specified, relationships between the focal position (general manager) and counter positions in other social systems need to be discussed. Two basic focuses are possible: 1) examining the relationships to a series of counter positions or 2) also, consider the relationships among counter positions (46, pp. 53-55). In this study, analysis of the specification will be mainly the first type.

In considering relational specifications of the position of general managers for local retail farm supply firms, certain observations about the characteristics of business firms in which operational managers are participating are relevant. General specifications were developed in the section on formal organizations. The position of general manager is a location in the business firm. In the literature, the incumbent to this position is often called manager, operational manager, general manager, or local retail dealer. The position is a location in a form of organization that has many of the characteristics of formal organizations, i.e., position of general manager is imbedded in a set of relationships characterized by formal organizations. The positional sectors of the general manager's position within the business firm that are of interest in this study are the relationships to superordinates and subordinates. The relationship of this position to other positions in the hierarchy of positions depends upon the economic structure of the business.

In the individually-owned business, two general conditions exist. "In the individually-owned business where the manager is also sole residual owner, he as owner-manager has full entrepreneurial and managerial responsibility for the business" (95, p. 16). In other words, this is the top hierarchal position. If the general manager is not the owner, then the position may be immediately under the position of owner in heirarchal ordering. In partnerships and independent corporations, the location of positions depends upon the amount each owner has invested in the business and whether one or both are serving as general managers. In the case of salaried managers, the position of general manager is below that of owners in the hierarchal arrangement. In farmer cooperatives, the manager is salaried and the owners are farmer members. A board of directors is elected by the membership from its own rank. The manager is employed and administratively responsible to the board of directors. In line companies, the position above the position of local retail manager is usually a position in a district or central office of the line companies. In all cases at particular local retail firm level, other employees are incumbents of positions which are lower on the hierarchy of positions than the position of general manager (manager, operational manager or dealer).

The other sectors of the operational manager's position to be considered in this study will be its relationships to certain counter positions in other relevant social systems and larger relevant subsystems of society. These counter positions include those of customers, suppliers and educators (for the training programs). In each of these counter positions, there will be many types and many incumbents, particularly in the case of customers.

Specification of position - situational

Gross, *et al.*, comment on situational aspects by stating:

> The specification of the scope of the social system designates the boundaries of the situation within which the position is being studied. Within these boundaries, however, the situation may include a number of different elements. If we choose a specific community in which to study a given position a complex set of situational factors is implied, for example, the size of the community, the resources available to it, and so on. (46, p. 56)

The linkage of the business firm to other social systems and to larger social systems of which it is a part was discussed in the section on setting of the retail firm and the problem setting chapter of this report. Viewed from the firm, this is in one sense the external environment. The internal environment has not been discussed. This discussion will center on those factors which differentiate it from other social systems and formal organizations.

The local retail business serving agriculture in farm supply and marketing capacities, like all businesses, is a special type of social system. The only exception to this is the individually-owned business firm operated by the owner with no employees. Although, the retail farm supply and local marketing businesses are not of the size and complexity of the large industrial firms and other large businesses, nearly all of these firms are organizations with characteristics such as hierarchy of position, division of labor, status and roles. These local retail farm supply and marketing firms will have certain characteristics which are similar to other organizations which were organized for economic purposes. The business firm is an organization oriented to economic production.

As stated by Parsons, in viewing an organization as a special type of social system, "Certain of its special features will derive from goal-primacy in general and others from the primacy of the particular type of goal" (88a, p. 66). Some of the relevant characteristics of a firm are outlined by Shubin (106):

> The firm as a business unit consists of capital facilities and other resources devoted to a profit-making venture under unified managerial control. Comprised of one or more establishments, the firm buys labor services and various material resources in one set of markets, transforms the material through a productive process (adds value), and then sells the goods or services in another set of markets with the purpose of making a profit. The firm's business operations and productive process are characterized by interdependence of functions and division of labor. A business enterprise relies on a central controlling authority to integrate and coordinate the specialized activities and commercial transactions of the enterprise. The firm is primarily the governing agency exercising control over commercial transactions and plant establishments producing and distributing goods and services for a profit. (106, p. 244)

Many of the points outlined about organizations in general can be seen in this brief quotation from Shubin's discussion of the business firm. From the resources of land, labor, capital and management is produced an identifiable output(s)--goods and services--for which some kind of exchange exists at the system's boundary. This exchange most often involves money but it could be trade. The characteristics outlined by Shubin also apply to local retail firms. For instance, as Phillips states, "The local marketing and retail farm supply business, like all business enterprises, is engaged in the production of goods and services" (95, p. 21). Some of the characteristics of the local farm supply businesses stem from the fact that they are organizations with an orientation to economic production. Because general organizational characteristics, application of the social system approach to business and the setting of the retail business have been discussed, the present discussion will center on some distinguishing characteristics of local and retail farm supply businesses. There are several classifications of variables which could be used to discuss the characteristics of the firm. One classification of variables for the firm is presented by Sorenson (113). This classification will be used to discuss situational factors for the general manager.

Sorenson classifies variables which are relevant in viewing firm behavior as: "Outcomes, behavioral variables and a set of variables that specifies the internal and external conditions which face the firm" (113, p. 138). According to Sorenson, the external and internal conditions which face the firm will influence the decisions made and action taken by the firm as it acts to attain certain kinds of outcomes (results). Sorenson states:

> . . . firms will act to attain certain kinds of results or outcomes. These arise when firms make decisions and take actions related to pricing, production, promotion, and organization. The behavioral variables (pricing, etc.) can be manipulated by the firm to attain sought-after ends or goals. The kinds of action taken and the results of the action will be influenced in turn by conditions internal to the firm and conditions external to the firm. The outcomes that the firm attains will include its rate of earnings or profit levels, cost levels, market penetration, market power, and organizational adjustment. (113, pp. 138-139)

Many of the environmental factors, as he classifies them, were discussed in the previous section and problem setting chapter. He places the variables internal to the firm under three major headings: 1) "the firm's physical and human resources base including managerial resources," 2) "the firm's physical and administrative organization," and 3) "the goals or objectives of the firm" (113, p. 139). This section will concentrate on internal variables.

Goals It has been suggested that organizations are usually planned to some extent as a means for attaining certain objectives. The first question which needs consideration is, "What are the goals of business firms, particularly local retail farm supply business?" The next question is, "To what extent are the means used for goal attainment effective and efficient?" In order to measure the effectiveness and efficiency impact of a training program, it is necessary to make certain assumptions about the goals of the organization in which the general managers occupy positions. In general, effectiveness may be viewed as the extent to which the firm's (organization's) activities attain its goals. As pointed out previously, goals may not be static over time but may change as the internal and external situation of the organization changes. As stated by Thompson and McEwen:

> It is possible, however, to view the setting of goals (i.e. major organizational purposes) not as a static element but as a necessary and recurring problem facing any organization. (120, p. 23)

However to measure the effectiveness and efficiency of the business firm in this study the major goals will be considered static.

Organizational effectiveness is defined by Georgopoulos and Tannenbaum as:

> . . . as the extent to which an organization as a social system, given certain resources and means, fulfills its objectives without incapacitating its means and resources and without placing undue strain upon its members. This conception of effectiveness subsumes the following general criteria: (1) organizational productivity, (2) organizational flexibility in the form of successful adjustment to internal organizational changes and successful adaption to induced change; and (3) absence of intra-organizational strain, or tension, and conflict between organizational subgroups. These three criteria both relate to means-ends dimension of organizations and potentially apply to nearly all organizations. (38, pp. 535-536)

Efficiency usually involves some concept of output to input. From an organization standpoint, the measurement would take into account all output and all input. This is unattainable because it is impossible to operationalize all effects on the output and input sides. For instance, how can a member's health, energy, mental state and loyalty be operationalized to compare output with input. The efficiency measures in this study will be mainly economic because of the goal primacy of economic production and the problems in operationalizing and measuring other types of inputs and outputs. Leftwich states, "The economic efficiency of a particular productive process is the ratio of useful product output to useful input of resources" (63, p. 16). Dollars are used to measure the usefulness of either the output or input. "Economic efficiency is measured in terms of the value of product output per unit input of resource value" (63, p. 17).

What goal(s) does the business firm have?

Although, some discussions do not include "at a profitable level," in general, the goal stated for the business firm is the production of goods and services at some profitable level. Controversy exists on whether or not the assumption of profit maximization is valid. The usefulness of the profit maximization assumptions is challenged most frequently when a market situation is pure monopoly, oligopolistic or monopolistic competition rather than when the market situation is pure competition.

> The assumptions of profit maximization followed from the assumption of perfect competition as a necessary consequence. And even where the assumptions of perfect competition are only approximately fulfilled . . . the use of the profit assumption as a survival condition is justified. However, once one departs from the large numbers case, its great a priori plausibility is no longer secure. (133, pp. 17-18)

However, Kohls feels the additional dimensions which have been added to profit maximization has narrowed the controversy:

> Sociologists and others have long criticized as too narrow and constrained what they have assumed is the economist's assumption of man as a profit maximizer. Increasingly, however, the debate has narrowed as economists have added additional dimensions to the idea of profit maximization, such as the short and long run, consideration of risk and uncertainty, etc. (59, pp. 10-11)

These dimensions have been added by several persons both economists and others writing about business. If the profit maximization is not assumed, "What are the alternatives?" The range seems to be from writers:

> . . . who caution that it is possible that organizations do not have specific goals, but simply react and behave in response to a given situation guided only by some rough criteria for determining satisfactory behavior. (59, p. 12)

to some modification, for instance:

> Whereas I retain the basic rationality assumption and deal with many of the same issues as the classical theory of the firm, I interpret the motivation for economic behavior somewhat more broadly than the classical theory and extend the range of issues upon which insights are obtained. (133, p. 2)

Baumol proposes the goal is one of total revenue expansion limited by a minimum level of acceptable profits. He views this as especially true in the large corporations because of the separation of management and ownership in a large corporation (12). Cyert and March use as the critical unit of analysis the decision-making process. From their point of view, decision making is characterized by intended, but bounded, rationality. The behavior of the firm will be characterized by adaptive rather than maximizing resources (31).

Simon, who has been a persistent advocate of revision of the theory of the firm, also stresses decision making in his framework concerning organizations. Simon has been critical of global rationality characteristics assumed for economic man and suggests a more realistic appraisal. Simon's principle of "bounded rationality" visualizes the individual as "satisficing" rather than "optimizing" (109, p. 243). Rationality is "bounded" by social and psychological limits. The individual constructs a limited, simplified model of the real situation and a choice is made in terms of this model (109, p. 198; 71, p. 139). His framework applies for both individual decision making and decision making in organization.

> Most human decision making, whether individual or organizational is concerned with the discovery and selection of satisfactory alternatives; only in exceptional cases is it concerned with the discovery and selection of optimal alternatives. To optimize requires processes several orders of magnitude more complex than those required to satisfice. (71, p. 141)

> It has been the central theme of this chapter that the basic features of organization structure and function derive from the characteristics of human problem-solving processes and rational human choice. Because of the limits of human intellective capacities in comparison with the complexities of the problems that individuals and organizations face, rational behavior calls for simplified models that capture the main features of a problem without capturing all its complexities. (71, p. 169)

There are many other writers who could be included in this discussion on alternatives to or revision of the assumptions of the classical theory of the firm including profit maximization. However, the authors agree with Kohls who in discussion of factors of internal firm organization and behavior and their relation to research in market structures states, "The literature is full of possibly useful theoretical insights but is relatively empty of empirically tested conclusions" (59, p. 10). One of the four areas which he suggests for future research is "goals of firm behavior" (59, p. 10). This has several implications for this analysis: 1) there is not common agreement on goals of the business firm, 2) much of the writing is theoretical,

3) until more is known about goals of the business firm, some assumption(s) needs to be made about goals in order to analyze firms in research activities, and 4) some of the writings on theoretical revisions or modifications do not include the operationalizations necessary to apply to empirical research about firms.

Kohls provides a list of goals which may be relevant to businesses:

> The most usual listing of goals which may exist in some degree and may vary somewhat, or be in addition to the simplified profit maximization idea, would include the following:
> (1) Expand or grow in size
> (2) Maintain or enhance status or power
> (3) Control the important related parts of a business--a drive for closure of the system to secure greater independence from the market or other firms
> (4) Survive--very few managements choose to quit
> (5) Simplify or improve the management and handling of personnel in a firm--or at least not upset a satisfactory operating situation. (59, p. 12)

For the time being, it will be assumed, the ultimate goal of the firm is the provision of goods and services for the satisfaction of wants at competitive prices at a level which allows a profit so that it can continue its existence. Additional specification to this goal will be given later in this chapter. In the discussion on activities of and outcomes for the business firm, the assumptions to be used will be given.

Resources and organization The size and complexity of the local retail supply firm for which fertilizer and agricultural chemicals are product lines varies from that of the large corporation on which so much of the literature centers. However, most of the material presented about formal organizations applies in varying degrees to the type of firms represented in this study. Some of the special qualifications will be pointed out in the following discussion.

In discussing local marketing and farm supply businesses, Phillips states:

> The typical individual concern does an annual business of almost one-half million dollars and total sales of over a million dollars per year is not at all uncommon. In many instances the county elevator is the biggest business in the home town. (95, p. 4)

Although the retail farm supply business may be classed as small or moderate, it may be among the largest if not the largest business in the local community.

The size and complexity will vary with the nature of goods and services provided. "The total number of employees in local marketing and farm supply business varies from two or three up to twenty-five or thirty" (95, p. 4).

There is less specialization of function in the retail farm supply businesses than in the larger business firm or large organization. In general, at the local retail firm level, the problems of integration, communication and control may not be as complex as in larger organizations, although they still are very important.

Phillips discusses several characteristics about the employees of the local retail business:

> Only in very rare cases are the employees of these businesses unionized . . . . Generally they are home town people and know one another's family background and life history. Often they each have specific responsibilities that are quite different from those of the next employee . . . the high percentage of key employees compared to the employees doing routine labor work . . . . In contrast to the other employees, the managers . . . of local marketing and farm supply companies often are not originally from the same town where the business is located. (95, pp. 4-5)

There are four basic types of economic structures of the local retail farm supply and marketing businesses: individually-owned businesses, partnerships and independent corporations, farmer cooperatives and line companies. The relationship of positions (owners, managers, employees) within each of these types of economic structures was discussed in the previous section. The division of managerial responsibility is influenced by the type of economic structure. As stated by Phillips:

> The managerial responsibility in local marketing and retail farm supply businesses is much more nearly concentrated with one individual than it is in large business concerns . . . . The major responsibilities for planning, organizing, directing, coordinating, and controlling the local agricultural business is shouldered by the manager. However, some of this responsibility is shared with him by residual owners or their representatives on the one hand and the key employees on the other. The extent to which the manager's responsibility for overall organizational and operational planning is limited depends primarily on the basic economic structure of the business. (95, p. 14)

There are many definitions available for management. There is no consensus on a uniform definition of management. As stated by Baumel and Fuller, "No uniform concept of management exists. We shall consider management to consist of decision making and of implementing these decisions" (11, p. 857). Clough also stresses decision making, "Management, then, is, ' the art and science of decision making and of leadership'" (29, p. 2). Phillips differentiates entrepreneurship and management:

> The functions of entrepreneurship in business are only two--risk and uncertainty bearing and policy decision making. The economic reward to entrepreneurship is profit. The entrepreneur is the person or persons whose net income depends directly upon the profit or loss of the business. (95, p. 6)
>
> Management is usually much more broadly defined than entrepreneurship by authors of business management texts and by business managers themselves. Although management includes the decision-making function of entrepreneurship, it includes a great deal more. Management includes decision making based on uncertainty. It includes implementing decisions as well as making them. Salaried managers are not only possible, but are common in local marketing and farm supply businesses as well as in other sectors of the business world. (95, p. 6)

In classical theory, the five general areas, functions or activities of management are planning, organizing, coordinating, directing and controlling. These activities of management apply to all types and sizes of business, ranging from a small retail store to a large industrial corporation. Also these activities apply to various departments and subdepartments within the business. The application of these activities along with the use of an accounting system and budgeting is made by Phillips to local marketing and retail farm supply businesses (95, pp. 59-210). Therefore, they will not be discussed in detail. However, the framework and discussion presented by Phillips will be used for the purposes of deriving theoretical hypotheses and constructing empirical measures.

Because of relative size and complexity of the business firms included in this study, two additional factors are important. First, with the resources which the retail farm supply unit have available, it will be very difficult for them to organize formalized internal training programs at the local level. Much of the training of the employees will be informal "on the job" training.

The formalized training of managers and key employees will be highly dependent upon prior training and formalized training available to them through programs and short courses sponsored by suppliers, regional cooperatives, parent companies and educational institutions. This places increased importance upon measuring the influence of training programs of the nature of the one conducted as part of this project. Second, the local retail farm supply firm may find it more difficult to obtain capital for research or expansion of the firm than large concerns.

Expectations and behavior

At a theoretical level the relationships between the focal position (general manager) and relevant counter positions for this analysis have been discussed. Both relational and situational aspects of the specification of position were included. Nothing has been said about expectations and behaviors which describe the positions. Gross, et al., make a distinction between location itself and " . . . expectations and behaviors by means of which the position is described. This distinction is made for analytic purposes since concretely we never have a position with expectations and behaviors" (46, p. 58). Their distinction between expectations and behavior deals with two aspects of social relationships--the normative and behavioral. The difference being what an incumbent of a position should do and what he actually does. This is very relevant for the present study because to predict and qualify changes in the subsequent adaptive behavior of general managers some standard is needed with which to contrast actual performance. In other words, it is necessary to determine if the general managers are approaching "what an operational manager should be doing" after a training program than they were before it. The definition of expectation used by Gross, et al., follows:

> Networks of positions can be analyzed with respect to either how the incumbents of the positions should interact with each other or how they actually do interact with each other . . . . An expectation will be defined as an evaluative standard applied to an incumbent of a position. (46, p. 58)

As mentioned previously, they reviewed several definitions of roles. Their definition of role depends upon their definition of position:

> We propose to restrict our definition of role to a set of expectations: A role is a set of expectations, or in terms of our definition of expectations, it is a set of evaluative standards applied to an incumbent of a particular position. (46, p. 60)

For the purpose of the present study, their definition of location and role will be used. In this analysis, the role definers will be essentially staff members of Iowa State University who served as committee members of the action and research committees, the sponsors of this research project, those persons who served in an advisory capacity, and individuals making presentations during the training program. This will give a standard against which changes in behavior can be evaluated. Gross, et al., do not put any restrictions on who the role definers may be. As they state:

> In addition, no restrictions are placed by this definition on the definers of the expectations. The concept may consequently be used in analyses in which the incumbents of the position as well as non-incumbents of the position are the definers of the role or, in general, in analyses of a role as defined by any population an investigator wishes to specify. (46, p. 61)

Because multiple expectations are involved, role segmentation is necessary. " . . . segments are parts of roles" (46, p. 61). Differentiation is made by categorizing the expectations in three categories: 1) "role sectors," 2) "rights and obligations," and 3) "behaviors and attributes" (46, p. 62). Their definitions of these concepts follow:

> A role sector is a set of expectations applied to the relationship of a focal position to a single counter position.
>
> A right of an incumbent of a focal position is an expectation applied to the incumbent of a counter position.
>
> An obligation of an incumbent of a focal position is an expectation applied to the incumbent of a focal position.
>
> A role behavior is an actual performance of an incumbent of a position which can be referred to an expectation for an incumbent of that position.
>
> A role attribute is an actual quality of an incumbent of a position which can be referred to an expectation for an incumbent of that position.
>
> A role behavior sector is a set of actual behaviors which can be referred to a set of expectations for behaviors applicable to the relationship of a focal position to a single counter position.
>
> A role attribute sector is a set of actual attributes which can be referred to a set of expectations for attributes applicable to the relationship of a focal position to a single counter position.

> A sanction is a role behavior the primary significance of which is gratificational-deprivational. (46, p. 67)

In this study, the concern with normative behavior is to provide a means to specify certain standards for the occupants for the managerial position in local retail farm supply firms. The role definers have been specified. This standard will give an opportunity to contrast "actual" adaptive behavior prior to training with subsequent "actual" behavior. It will be possible, within measurement limitations, to determine if subsequent "actual" adaptive behavior is closer to or farther away from the standard than was the "actual" adaptive behavior prior to training.

The framework developed by Gross, *et al.*, provides an opportunity to distinguish qualifications and performance. As stated by Gross, *et al.*:

> This basis of role segmentation provides concepts by means of which an investigator can distinguish between what incumbents of positions should do and what incumbents of positions should be, or the characteristics they should have. A role can be segmented into expectations for behaviors and expectations for attributes. (46, p. 64)

Hence, standards can be obtained for the attributes or characteristics which are desirable for general managers. In this study, knowledge and attitudes are among the specific attributes or characteristics analyzed. In a more general context, certain knowledge could be considered as an education qualification for general managers. Certain attitudes could be considered as a part of general personality characteristics of general managers.

Also, standards can be obtained for the types of activities and the quality of these activities which are desirable for general managers of local retail supply firms. Within measurement limitations, it will be possible to determine if subsequent "actual" performance is closer to or farther away from the standard than was "actual" performance prior to training.

The normative theoretical framework is presented in the derivation of the hypotheses section. In determining whether or not the educational objectives of training programs are accomplished, standards for what general managers "should do" and the "characteristics they should have" need to be established in order to determine if changes were in "desirable" directions.

Derivation of General and Supporting Hypotheses

The two units for analysis in this report are individuals and social systems. The individuals are divided into two classifications--individuals participating in a training program and similar individuals not participating in the same training program. The social systems are divided into two classifications--business firms of individuals participating in a training program and business firms of similar individuals not participating in the same training program.

Before stating the general and supporting hypotheses, the general conceptual framework will be briefly presented.

The first theoretical proposition stated was: Individuals can be motivated to participate in a series of formalized learning situations. Based on the discussion about human learning and the area of interest of this study, the proposition was restated as: *Individuals can be motivated to participate in an adequately conducted training program*.

The second theoretical proposition stated was: Individuals participating in a series of formalized learning situations will have greater changes (direction predicted) in relevant aspects of their adaptive behavior in subsequent situations than will individuals not participating in the same series of formalized learning situations. Based on the discussion of human learning and the area of interest of this study, the proposition was restated as: *Individuals participating in an adequately conducted training program will have greater changes (direction predicted) in relevant aspects of their adaptive behavior than will similar individuals not participating in the same training program*. Based on the discussion of human behavior and learning and the area of interest of this study, subsequent behavior was divided into three areas resulting in the following lower level propositions:

A. Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their *knowledge* in those content areas included in the program than will similar individuals not participating in the same training program.

B. Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their *attitudes* than will similar individuals not participating in the same training program.

C. Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their performance than will similar individuals not participating in the same training program.

The third theoretical proposition stated was: Individuals for whom learning has taken place as a result of participating in a series of formalized learning situations will have greater changes (direction predicted) in specified outcomes from their subsequent adaptive behavior than will similar individuals not participating in the particular series of formalized learning situations. In a social system framework and viewed from the point of view of the individual, outcomes for an individual member could be viewed as changes in the elements and elemental processes, master processes and activities of the social system in which he is a member. Viewed from the social system, these changes in the internal environment and activity variables of the social system will be reflected in the effectiveness and efficiency of the social system. The third proposition could be stated either from the viewpoint of the individual or from the viewpoint of the social system. Further, this proposition could be viewed as effecting several social systems, e.g., the family social system, the community social system, the occupational system, etc. In this study, the concern is only with the occupational social system, i.e., the social system in which the individual has his major employment for monetary enumeration. Because an occupant of a position in a social system received the training from an outside source, the lower level proposition will be stated from the viewpoint of the individual and the occupational social system:

> Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in the elements and elemental processes, master processes and activities in their occupational social system than will similar individuals not participating in the same training program.

From a social system viewpoint, changes in elements and elemental processes, master processes, activities and qualifications of individuals occupying positions should be reflected in outcomes (effectiveness and efficiency and result variables) for the social system, particularly if it is an occupational social system. If the training program changes the knowledge, attitudes and performance of individuals and these changes influence the internal environment and activities of the social system, then the outcomes for the social system should reflect both types of changes. Based on preceding discussions, another theoretical proposition is:

> Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in the outcomes of their occupational social system than will similar individuals not participating in the same training program.

In the present study, the interrelatedness of the theoretical propositions will not be tested due to data limitations. Because observations were made at points in time relatively far apart, over a three year period, the order of change is not possible to ascertain.

In this section, each proposition will be specified in more detail. The sections in this chapter were directed at specifying the types of behavioral changes for general managers, the type of internal environment and activity changes which might occur for the business firm and the changes in outcomes which might occur for the business firm. The sections on learning and attitude formation were presented to provide guides in relation to knowledge and attitude changes. The sections on formal organizations and retail firms were presented to provide guides for defining the role of the general manager and what changes might occur in his performance as a result of participating in the training program. Also, these sections are presented to provide guides for defining the changes in internal environment, activities and outcomes which might result from the participation of the general manager in a training program.

The procedure will be to present the normative framework, then the general and supporting hypotheses. The discussion on the qualifications for general managers of local retail farm supply firms will be limited to knowledge and attitude variables. Although other variables are important, these are among the major variables which might be influenced by a training program. The next section presents a discussion on role performance of general managers followed by a discussion of the changes in the internal environment and activities of the firm. The last area to be discussed is the outcomes for the business firm resulting from operational management. The general and supporting hypotheses have reference to the training program discussed in the problem setting chapter. Although they have reference to a particular training program, they are included in the theoretical chapter because they are stated at a general level and should be applicable to similar training programs.

Knowledge changes

What are some of the knowledge qualifications of general managers of local retail farm supply businesses?

The general manager needs an understanding of business management and the functions of management. As stated by Phillips, "An understanding of the functions of management and their application in business is a prerequisite to the development of managerial skill" (95, p. 7). In addition to the five functions of management-planning, organizing, directing, coordination and controlling--other areas often listed include: basic economic principles, advertising, promotion, merchandising, an understanding of organizations, an understanding of human behavior, group dynamics, leadership principles and practices, budgeting, accounting, decision making, planning and communication.

Since the majority of the activities of the local farm supply business are carried out directly with farmers, these customers often seek advice concerning their farm operations during the purchase of farm supplies.

> The farmer customer needs and seeks advice on his whole cropping program when he comes in to buy his farm seed and fertilizer. . . . This means that managers and other key employees of grain, feed and other businesses serving agriculture must be more than good businessmen. They must have a thorough agricultural background and a genuine appreciation for and understanding of approved farm practices in their local area. (95, p. 5)

Because the general managers in this study managed businesses which sold fertilizer and agricultural chemicals, it is assumed that an understanding of basic principles about fertilizer, fertilizer use, agricultural chemicals and agricultural chemicals use is desirable. As pointed out in the problem setting chapter, the dealer and university personnel are often named by farmers as sources of information and recommendations about fertilizer and agricultural chemicals.

Based on the preceding discussion, the theoretical proposition about knowledge will be restated as a general hypothesis. On page 97, this proposition was stated as: Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their knowledge in those content areas included in the training program than will similar individuals not participating in the same training program.

General hypothesis 1: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge of those content areas included in the training program than will similar general managers not participating in the same training program.

Concepts used in the general hypothesis are defined as follows:

General managers are the incumbents of the positions of operational manager in local retail farm supply firms. The general manager is responsible for operating the business within the restrictions imposed by the owners or positions above the position of general manager. The general manager has full responsibility for operational management. The responsibilities of the general manager will be discussed in more detail in the next section. The general manager is often called operational manager, retail dealer, fertilizer dealer, feed dealer, etc. depending on the viewpoint of the writer, the area of interest and sectors of role which are of interest.

Participating is defined as attending a majority of the training sessions provided and making an active attempt to benefit therefrom.

An adequately conducted training program is defined as a thorough systematic coverage of the subject matter involved in a series of formalized learning situations (sessions). It is assumed to take into account the basic principles about human behavior and learning (at a minimum those specified earlier in this report).

Content areas are defined as those areas of subject matter pertaining to the general managers' businesses which are included in a training program.

Increased knowledge is defined as acquiring more knowledge than previously held in regard to specific content areas.

Similar general managers are incumbents of the position of general manager in similar local retail farm supply firms. Similar refers to having a general likeness in specified areas. Similar general managers refers to: 1) general managers who have similar characteristics and attributes at the beginning of the experiment and 2) to the experience worlds of the general managers--although not identical, it is assumed that relevant aspects of the social and physical environment will be similar during the experimental period.

General managers participating in the training program received training in the areas outlined in the discussion about the training program. It was assumed, by the training program action committee, that these areas would be relevant to the general managers in performing their role in the local retail farm supply businesses. Because of the size and complexity of the training program, it is impossible to secure data on all areas of training. The research committee selected representative areas of training to accomplish the research objective: "To determine the impact of the training program on increasing general managers' knowledge and understanding and changing general managers' attitudes and perceptions." The knowledge areas selected were: knowledge about fertilizer and fertilizer practices and use, knowledge about agricultural chemicals and their use, knowledge about farmer customers and knowledge about business management.

Supporting hypothesis 1: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge about fertilizer than will similar general managers not participating in the same training program.

Knowledge of fertilizer is defined as the general managers' knowledge of the agronomic and economic principles of fertilizer and fertilizer use in farming operations and their knowledge of the fertilizer industry as it pertains to their business operations. From the viewpoint of the business firm, the general manager should be familiar with this product line. Past findings indicate that high volume dealers have significantly higher knowledge about fertilizer and fertilizer use than low volume dealers (14,15,16,128). As pointed out previously, farmers expect fertilizer dealers to be a source of information and recommendations about fertilizer and fertilizer use (14, 15,128). Therefore, the general manager, as a fertilizer dealer, needs a thorough knowledge of fertilizer in order to adequately provide accurate information and make recommendations to farmer customers. The general managers should be concerned that the farmers have adequate knowledge of fertilizer and its use so that it will be used according to recommendations and the results from the use of fertilizer evaluated properly. There are two main reasons why the general managers should desire farmers to be satisfied with the results: 1) so that these farmers will be repeat customers and 2) so that these farmers influence other farmers to use fertilizer. Research findings indicate that farmers do use other farmers as a source of information about fertilizer and fertilizer use (128).

Supporting hypothesis 2: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge about agricultural chemicals than will similar general managers not participating in the same training program.

Knowledge about agricultural chemicals is defined as the general manager's knowledge about the principles of agricultural chemicals and their use in farming operations. This knowledge includes basic principles of weed control and basic principles of insect control. The general manager should be familiar with this product line. Past findings indicate that high volume dealers have significantly higher knowledge about agricultural chemicals and their use than low volume dealers (14,18). Farmers expect agricultural chemical dealers to provide them with information about agricultural chemicals and their use (20, 25,128). Thus, the general manager, as an agricultural chemical dealer, needs a thorough knowledge about agricultural chemicals to adequately provide accurate information and make recommendations to farmer customers. Their concerns for this are, in general, the same as those mentioned above for fertilizer.

Supporting hypothesis 3: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge about their farmer customers than will similar general managers not participating in the same training program.

Knowledge about farmer customers is defined as the general managers' knowledge about the social and economic setting of their farmer customers and the role which they, as retail dealers, play in relation to those farmers with whom they do business. A part of the general managers' understanding of their role with farmers is to possess knowledge of what the farmers expect of them as retail dealers. In addition to being a source of supply, farmers expect dealers to be well enough informed on the products which they sell, so that they can, and will, supply technical information and make recommendations for the use of the product (16,128). Although dealers are not the only source of information used by farmers, they appear to be a strategic source. They are the source of supply for fertilizer and

and agricultural chemicals; therefore, farmers contact the dealers as they make their purchases.

Previous research has also shown that farmers' knowledge of these products and their use is generally inadequate. Therefore, this is one of the reasons they look to someone to help them fill this need for more information (128). Those dealers who provide information and make recommendations about fertilizer and agricultural chemicals have higher volume sales than the dealers who do not provide these services (14,16,128).

If general managers are to plan and carry out services, including educational services, an understanding of the social and economic setting of their farmer customers is essential. If their recommendations are to be based on sound management practices they need an understanding of the economics of the farm business.

Supporting hypothesis 4: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge about business management than will similar general managers not participating in the same training program.

Knowledge of management is defined as the general managers' knowledge about the functions of management and their knowledge of basic economic principles and practices and their application to the management of local retail farm supply businesses. Because of the relationship of knowledge to performance, it is assumed that basic knowledge about management is necessary for effective management. Also, it assumes that knowledge will be reflected in the performance variables.

Attitudes

The training program represented a situation in which attitude change could and was expected to be brought about. The methods involved included formal lecture presentations, the use of visual aids, case example problems, result demonstrations and group discussion sessions. Through these methods, the training program provided many stimuli which had the potential of creating and increasing the degree of favorableness of attitudes toward the areas covered in the intensive training program.

Based on the preceding discussion and the discussion of the training program, the theoretical proposition about attitudes will be restated. On page 97, this proposition was stated as: Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their attitudes than will similar individuals not participating in the same training program.

General hypothesis 2: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes related to those content areas included in the training program than will similar general managers not participating in the same training program.

Supporting hypothesis 5: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes toward fertilizer than will similar general managers not participating in the same training program.

Attitude toward fertilizer is defined as the degree to which a dealer perceives fertilizer as being an important (profitable) product line and as being a profitable investment for farmers. Findings from past research indicate that there is a direct relationship between dealers' attitudes toward the fertilizer business and their fertilizer business volume (14,16,128). In past research, the perceived importance of the fertilizer department in the total business was found to be related to fertilizer volume. It is assumed that if general managers, as fertilizer dealers, have favorable attitudes toward fertilizer, their fertilizer departments and fertilizer as being a profitable investment for farmers then they will be more likely to improve their ability in operational management of the department.

Supporting hypothesis 6: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes toward agricultural chemicals than will similar general managers not participating in the same training program.

Attitude toward agricultural chemicals is defined as the degree to which a general manager perceives agricultural chemicals as being an important (profitable) product line and as being a profitable investment for farmers. Findings from past research indicate that there is a direct relationship between dealers' attitudes toward the agricultural chemicals department and their agricultural chemicals business volume (14,128). It is assumed that if general managers, as agricultural chemicals dealers, have favorable attitudes toward the agricultural chemicals department of their business then they will be more likely to improve their ability in operational management of this department.

Supporting hypothesis 7: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes toward operational management than will similar general managers not participating in the same training program.

Attitude toward management is defined as the degree to which a general manager perceives management as being important to his business. In previous research, two measures have been developed: a progressivism scale and an opinion leader index (28). The scores of both these measures were found to be significantly related to fertilizer knowledge scores and certain economic indices of the fertilizer department (28,128). The progressivism scale was developed to measure dealers' predispositions toward the adoption of new merchandising techniques and practices (28). The opinion leader index was developed to measure the extent to which the individual dealer believes he should attempt to influence the customers' decisions about the amount and analysis of fertilizer to apply and how to apply it (28). Both of these scales were used in this study.

In past research when large volume agricultural chemicals dealers were compared to dealers with smaller volume, the large volume dealers: 1) tended to see themselves as technically qualified sources of information on agricultural chemicals, 2) believed that they were as well qualified to provide information on agricultural chemicals as on other product lines, and 3) believed that they should make recommendations to farmers on agricultural chemical use (14).

It is assumed that if general managers have favorable attitudes toward new merchandising techniques and practices and being opinion leaders (attribute sectors) then they will be more likely to improve their ability (behavior sectors) in their areas of responsibility in operational management of the business. The areas included under this hypothesis are: 1) role with farmer customers and 2) orientation to management of the business operation.

Changes in performance

Educational objective level B was to motivate dealers to carry out certain actions and activities in their role as general manager (dealer) of the local retail farm supply business and as a dealer for fertilizer and agricultural chemicals. Based on the discussion of the training program, certain training areas and techniques were planned and implemented to motivate the general managers to participate in the training and carry out certain actions and activities in their role as general manager of the local retail farm supply business. In order for the training program to have an impact on the general manager, he must be motivated: 1) to participate in the programs, 2) to be receptive to the training offered so that he may consider alternatives open to him, and 3) to use the training received in making and implementing specific decisions. Research objective level B was to determine the influence of the training program on general managers' (dealers') actions and activities. The general managers' responsibilities in general management need to be specified in order to determine those areas in which changes could occur. In providing a normative framework, the division of management in the local retail farm supply firm and the responsibilities of general manager will be discussed.

In addition to personal and social characteristics of the manager, the division of management in the local retail farm supply business depends upon two major factors: 1) the basic economic structure of the business and 2) the size and complexity of the business. The first factor limits the general manager's responsibility for over-all organizational and operational planning. This is the area which Parsons calls policy decisions. Holden, *et al.*, placed the "trusteeship function" in zone 1 of their zones of top management in organizations (52). This function, " . . . is to represent, safeguard and further the stockholders' interests, determine the basic policies and general course of the business, appraise the adequacy of over-all results and in general protect and make the most effective use of the company's assets. This field is the exclusive province of the board of directors" (52, p. 76). Phillips places four areas in over-all managerial planning and organizing:

> . . . (1) the basic organizational structure of the business and its relationship to its owners, (2) the financial structure for the business, (3) setting up the merchandising operation, and (4) planning plant and facilities for an efficient and low cost operation. (95, p. 211)

Baumel and Fuller divide management into two levels, strategic and operational. "The responsibilities of strategic management include decision making with respect to the combination and levels of inputs and outputs, plan location, financial structure and basic operating policies" (11, p. 857).

The strategic level of management makes " . . . long-run decision" and " . . . is normally performed by the owners or the board of directors" (11, p. 857). In this study, only one firm was an individually-owned business. Only in this case, will the person participating in the training program be responsible for strategic level of management. All of the other general managers will be responsible for an area of management within the scope of basic policies established by the owners (board of directors) or within the scope of policies established by the central or district office of the line company. As stated by Phillips, "The manager of the farmer cooperative is employed by and administratively responsible to the board of directors. The directors are elected by the membership from its own rank" (95, p. 17). In discussing the responsibility of the manager of a retail business for a line company, Phillips states, "The overall responsibility of the manager of the local business of the line company is certainly greater than that of assistant managers of the other types of business, but it is somewhat less than that shouldered by the managers of the other types" (95, p. 18).

Realizing that general managers responsibility for over-all management may be limited by the basic economic structure, there are certain areas of common responsibility for all general managers. The basic economic structure may limit the changes which a general manager can make as a result of participating in a training program. Changes in performance are being measured and the basic economic structures are represented in both the treatment and control dealers. As long as the major basic policies established by strategic management are not changed drastically there is an area of management upon which this research can focus. As stated by Baumel and Fuller, "Full responsibility for operational management is normally assumed by the general manager. Thus, the general manager, whether he is salaried or the owner is responsible for several distinct areas of management" (11, p. 858). Phillips states:

> Except when the owner (or one of owners) himself serves as manager, operational management is the direct responsibility

> of the salaried manager in local marketing and retail farm supply businesses. Thus, operational management is not an entrepreneurial function. (95, p. 357)

The second factor mentioned, which may influence the division of management in the local retail farm supply business, was the size and complexity of the business. This factor mainly influences the degree and amount of managerial responsibility that employees occupying positions below the general manager have. These two factors and the social and personal philosophy and characteristics of the general manager influence how operational management is shared by the general manager and key employees of the business. What are some specific responsibilities of the operational manager?

According to Baumel and Fuller:

> The operational manager is responsible for operating the business from day-to-day and must operate within the restrictions imposed by strategic management. In the short run, he must take, as given, certain assets of the firm, the type of organization, the financial structure, the labor resources, basic operating policies and the market situation. Thus, the decision-making responsibilities of the operational manager consist primarily of recurring or tactical decisions. (11, p. 857)

According to Phillips:

> The operational manager is a business planner, but the planning he does is more detailed and more specific to various phases of operations than the overall planning for the business. Operational planning operates within the framework of the overall plans for the business. The operational manager is an organizer and director of business operations. He executes plans as well as making them. And the operational manager is a coordinator and supervisor of business operations. He is responsible for seeing that his directions are carried out in the operation of the business. So the operational manager performs all five of the essential functions of business management. But he performs them at the operational level rather than the entrepreneurial or basic policy level for the business. (95, pp. 357-358)

Both Phillips and Baumel and Fuller state the same general areas of operational managerial responsibility: 1) personnel or employee management, 2) customer relations management, 3) retail selling and purchasing or sales management, 4) wholesale buying and selling or wholesale merchandising management, 5) retail credit management, 6) custom services, and 7) inventory management. Baumel and Fuller do not list custom services separately.

What is the overriding objective of general managers? According to Baumel and Fuller:

> The objective of operational management then is to make the business as profitable as possible within the restrictions imposed by the strategic level of management. (11, p. 858)
>
> Throughout this research, profit maximization is the assumed management goal. It has been frequently suggested that profit maximizing models are unrealistic since other goals, such as growth, income stability, and survival, are relevant to the decisions of management. To the extent that profits are one of the goals of these firms, the results from a study using the traditional profit maximizing assumption will be useful. (11, p. 859)

According to Phillips:

> Within the overall objectives of the business, the direct objective of management is to make the business profitable. This objective is clear in the case of the owner-manager, because his personal income and the standard of living of his family depend directly upon the prosperity of his business. But it is equally true of the salaried manager. The specific responsibility of the salaried manager is to make the resources which the owners have entrusted to his care as productive . . . . (95, p. 7)
>
> In addition to economic service for customers, competitive wage, interest and rent payments are essential conditions within which management must operate.
>
> Within these conditions, however, the manager of any business is charged with the responsibility of directing that business in a way that will make it profitable to those who own it. The salaried manager is employed and paid specifically for his ability to do so.
>
> Given the resources he has to work with and the outside limitations affecting the business, the manager has the responsibility for organizing and operating his business in a way that will realize the optimum net income over time. (95, p. 8)

It is realized that general managers may have other goals and objectives which in some cases may conflict with the goals of the business firm.

Based on the preceding discussion and the discussion of the training program, the theoretical proposition about the performance will be restated. On page 99, this proposition was stated as: Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their performance than will similar individuals not participating in the same training program.

General hypothesis 3: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their operational management performance than will similar general managers not participating in the same training program.

Operational management is defined as planning, directing, organizing, coordinating and controlling the day-to-day business operations with the scope of basic policies established by strategic (over-all) management.

Performance is defined as the carrying out of the activities or functions of operational management by the general manager.

Although at a theoretical level a distinction can be made between over-all merchandising, customer relations, custom services and sales management; detailed specification is necessary in the theoretical hypotheses, empirical hypotheses and empirical measures if this distinction is made. In addition, one of the responsibilities of the general manager is providing advice and making recommendations to strategic management. In general, these very precise distinctions were not made in the attempt to measure the influence of the training program. Therefore, somewhat arbitrary decisions are made on what variables to include for measuring changes in role performance of the general manager and changes in the internal environment and activities of the firm. The decisions were based on the preceding discussion of the responsibilities of the general manager and the amount of freedom which it may be reasonable to assume that general managers have to make and carry out decisions in given areas. For instance in the area of fertilizer services, it is assumed that once the general policies were established about a soil testing program, the general manager could make decisions about the procedures for taking soil samples and interpreting soil test results without a board decision. However, the decision to offer bulk application of fertilizer would probably involve a board decision because of the expenditure of funds involved. Additional rationale for the classification of given variables is presented in the methodology chapter. The variables concerning the general manager's advisory role to strategic management are included in the section on changes in the internal environment and activities of the business firm. In most cases, these variables represent areas of over-all management.

Again, the limitation of funds and time prevent the measurement of all activities, functions and areas of operational management in the local retail farm supply firm. The research committee selected the following areas: 1) planning and decision making, 2) employee management, 3) procurement management, 4) inventory management, 5) retail credit management, and 6) customer relation and sales management.

Supporting hypothesis 8: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their operational management planning performance than will similar general managers not participating in the same training program.

Planning is defined as the process used by the general manager in projecting ahead, making decisions and developing means for carrying out and evaluating the decisions. One of the responsibilities of a general manager is to make major plans and decisions relating to the operational management of the local retail farm supply business. The process which a general manager follows in making a decision probably influences the soundness of the decision as well as the impact the decision has on the operations of the business. Therefore, the general manager needs to determine means for carrying out decisions and to develop criteria for evaluating the outcomes of the decision.

Supporting hypothesis 9: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their employee management performance than will similar general managers not participating in the same training program.

Employee management by the general manager is defined as planning, directing, organizing, coordinating and controlling business personnel. It includes deciding upon the number of employees needed, selecting new employees, training employees, "economic welfare of employees" and "developing a spirit of productivity among employees" (95, pp. 359-385).

Supporting hypothesis 10: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their procurement management performance than will similar general managers not participating in the same training program.

Procurement management by the general manager is defined as planning, directing, organizing, coordinating and controlling in the area of wholesale purchasing. It includes selection of wholesale sources, keeping informed about wholesale markets, timing purchases, specification of terms, selection of transportation and "using wholesale salesmen effectively" (95, pp. 447-478).

Supporting hypothesis 11: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their inventory management performance than will similar general managers not participating in the same training program.

Inventory management by the general manager is defined as planning, directing, organizing, coordinating and controlling in the area of inventories. It includes determining levels of inventory, "minimizing losses from changes in market prices," minimizing handling costs of inventories, financing inventories and using adequate inventory controls (95, pp. 479-502).

Supporting hypothesis 12: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their retail credit management performance than will similar general managers not participating in the same training program.

Retail credit management by the general manager is defined as planning, directing, organizing, coordinating and controlling in the area of retail credit. It includes determination of the level of retail credit; "tailoring a credit program for each customer"; distributing costs of credit among customers; supervising, collecting and financing the accounts receivable (95, pp. 525-550).

Supporting hypothesis 13: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their sales management performance than will similar general managers not participating in the same training program.

Sales management by the general manager is defined as planning, directing, organizing, coordinating and controlling in the area of retail selling of the products and services of the business. It includes pricing the products and services, activities connected with direct selling, retail advertising, merchandising and promotion (95, pp. 417-446).

Several services and promotional activities can be offered in connection with the fertilizer department. Some of the services and promotional activities are designed to inform the farmers of the importance of fertilizer and to influence them to use it at more nearly optimum levels. Phillips states, "When he (farmer) buys any farm supply, he does so with one purpose in mind--to use the product in his farm business with the hope of making his total operations more profitable" (95, p. 422). Phillips also states, "Direct selling, advertising and supplemental volume promotional efforts all have the same objective in the business--to increase the retail demand for its farm supplies . . ." (95, p. 420). In a previous research study, with the exception of credit, a greater percentage of high volume dealers were offering each of sixteen services than were lower volume dealers. Largest differences were in soil sampling and testing, fertilizer clinics, test plot examinations and direct farmer calls (16). In a study farmers were asked what services their dealers offered and also to name those fertilizer related services important to them. With one exception, credit, more farmers checked each of fifteen services as being important to them than checked these same services as being offered by their dealers (16). Some of the greatest discrepancies were in soil testing services, fertilizer clinics, demonstration plots, direct farm call regarding fertilizer use and checking fertilizer use results. "There is general consensus that successful dealers are merchandising fertilizer by offering a well rounded education, information, programming and service program rather than selling a product on price alone" (16, p. 23).

Changes in the internal environment and activities of the firm

Educational objective level C was to help general managers (dealers) to achieve certain changes in the internal environment and activities of the business firm. Research objective level C was to determine the influence of the training program on the internal environment and activities of the general manager's business firm. Again, only selected areas could be measured because of time and money limitations. The areas selected were: 1) advisory activities and functions of general manager, 2) goals, 3) fertilizer application services, and 4) facilities and equipment. In a social system framework, changes in outcomes (resulting from behavior changes) for the general manager could be viewed as changes in the activities, goals and facilities of the business firm. Viewed from the point of view of the business firm, these changes would be changes in the internal environment and activities (firm behavior). For example, the general manager may have the objective of adding bulk fertilizer to the services provided by the firm. An end-in-view objective would be convincing the board of directors to add bulk fertilizer. If he succeeded this would be an outcome for his actions and activities and it would be a change in the activities of the firm. What are the reasons that changes in policy areas or over-all management might be expected from the training received by the general manager who is responsible for operational management?

First, operational management will be reflected in the over-all activities, effectiveness and efficiency of the business firm. Second, in the long run, the general manager can influence the over-all (strategic level) management. The extent of this influence depends upon factors such as the personal and social characteristics of the owners (or board of directors or personnel in a district office of a line company) and the situation including relevant aspects of the physical and social environment. As stated by Phillips, "Over a period of time a capable manager should be able to exercise a great deal of influence over the basic design for the business" (95, p. 211). As stated by Baumel and Fuller:

> In the longer run, the operational manager ordinarily will be able to alter the profit potential. For example, he normally has authority to vary the level of some inputs, such as changing the composition of current assets and the quality of labor. He can modify the financial structure by altering the composition of the current liability accounts. Further, he can influence the basic operating policies of the business. (11, p. 858)

Third, one of the general managers' responsibilities is providing advice and making recommendations to over-all management. As stated by Phillips,

> . . . most local managers do not have full control over the basic design and method of operation for the business. . . . But if he understands the importance of these factors, he will be in a position to advise and recommend changes in them to improve operating efficiency. (95, p. 211)

As stated by Baumel and Fuller, " . . . the operational manager is responsible for making recommendations to the strategic level of management" (11, p. 858).

Based on the preceding discussion and discussion of the training program, the theoretical proposition about changes in the occupational social system will be restated. On page 98, the theoretical proposition was stated as: Individuals participating in training programs will have greater changes (direction predicted) in the elements and elemental processes, master processes and activities in their occupational social system than will similar individuals not participating in the same training program.

General hypothesis 4: General managers participating in an adequately conducted training program will have greater changes (direction predicted) 1) in the function of advising strategic (over-all) management, 2) in the internal environment of the firm, and 3) in the activities of the firm than will similar general managers not participating in the same training program.

It is assumed that changes in the attitudes, knowledge and performance of the manager will be reflected in changes in the internal environment and activities of the business firms.

Supporting hypothesis 14: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the function of advising strategic (over-all) management than will similar general managers not participating in the same training program.

Function of advising strategic (over-all) management is defined as making recommendations and providing advice to the over-all management. It is assumed that changes in performance in this area will be reflected in the business operations.

Supporting hypothesis 15: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the goals for their fertilizer and agricultural chemicals departments than will similar general managers not participating in the same training program.

A goal is defined as a future relationship which the members of a social system wish to establish between the social system and certain selected phenomena. Information provided to the general managers about the potential for increased fertilizer and agricultural chemicals sales and the potential of increased farmer use could influence the general managers to re-evaluate their sales and profitability goals for the fertilizer and agricultural chemical departments. This should have influence on activities of the social system.

Supporting hypothesis 16: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in fertilizer application services than will similar general managers not participating in the same training program.

Fertilizer application services are the application services (spreading and applying fertilizer) connected with the fertilizer department which are provided for farmer customers.

Supporting hypothesis 17: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their business firm facilities than will similar general managers not participating in the same training program.

Facilities are defined as capital investments in land, equipment and buildings used as a means of production for the business firm. It is assumed that to make certain changes in business operations that facilities and equipment may need to be increased or modernized.

Outcomes for the firm from operational management

Educational objective level D was to assist general managers (dealers) to achieve certain outcomes in their business operations: 1) increased volume, efficiency and profits in their entire business and 2) increased volume and marginal profitability of the fertilizer and agricultural chemicals department. Research objective level D was to determine the influence of the training program on: 1) the volume, efficiency and profits of their entire business and 2) the volume and marginal profitability of the fertilizer department.

As pointed out in the discussion of goals for the business firm, some assumptions about goals are necessary if measures of effectiveness and efficiency are to be developed. Realizing the limitations, some of which were mentioned in the previous discussion of goals for the business firm, the basic assumption of this study is that the goal of the local retail farm supply business is production of goods and services to maximize operational profits. The concern will be with operational profits which refer to those profits occurring from the operational activities of the business. This excludes profits from outside investments such as stocks and bonds.

Some support for this assumption will be briefly stated. Because the business firm has the goal of the production of goods and services, some economic measures of effectiveness and efficiency are desirable if the impact of a training program is to be assessed. To the extent that profits are one of the goals of business firms, using the assumption of profit maximizing provides a means of evaluating management. Operational measures of profit maximization derived from the theory of the business firm are available for the firm as well as for operational management under various assumed situations (9,12,97). The business firms of which this study is representative are usually not in a market situation which is a pure monopoly. Usually, the market type is probably more nearly monopolistic competition or oligopoly. Also, certain volume variables will be included in the analysis. Some writers suggest the difference concerning profit maximization goals is most evident between firms where owner-entrepreneurs are seeking to maximize profits and large corporations under salaried management. The firms for which this study are representative are small to moderate size businesses. Limitations of the assumption of profit maximization for any size firm are recognized. As stated by Gordon and Howell:

> Business decision-making is becoming increasing rational and, in this sense, 'scientific.' But in view of the complex and continuously changing environment within which business operates, complete rationality is impossible. Decisions must be made on the basis of incomplete information and in face of goals which may to some degree conflict. (42, p. 15)

The measurement of the training influence deals with operational management changes and certain changes in firm activities. The influence is not being measured only in terms of end results such as sales, profits and certain efficiency ratios. Other variables which could be conceived of as intervening variables were stated in the preceding hypotheses.

The assumption of profit maximization in a normative framework is often made. Normative is used here as what business firms should do, not necessarily what they are doing. Phillips states:

> The economic conditions for the most efficient organization of production in the individual business are usually specified in terms of a single goal--to make the business as profitable as possible. (95, p. 21)

A few additional comments about profit maximization in retail farm supply firms appear relevant. They are not to support the assumption of profit maximization but to develop some added dimensions for multi-product and multi-factor firms.

Many of the local retail farm supply firms of the type represented in this study for which fertilizer and agricultural chemicals are product lines, are engaged in farm product marketing activities. One of the more common product lines is grain trading. In addition, many of these firms will handle products other than fertilizer and agricultural chemicals and will have services connected with these products. The firm is multi-product as far as output is concerned and multi-factor on the input side. Because the firm generally operates under other than perfectly competitive situations, there are sloping demand curves for the firm's outputs and sloping supply curves for the firm's inputs. The firms are often faced with price (market) as well as technical interdependence among product outputs and among factors (inputs). Price interdependence refers to the revenue received for products. "When we consider the actual additional revenue (marginal return) of selling another unit of product A, we must take into account not only the effect on the total return for all units of A, but the effect on the total revenue for all units of all other products produced by the firm as well" (95, p. 33). Technical interdependence refers to the production interrelationships. In the production of another unit of A, the effect on amount of all other products produced by the firm must be considered. "If, in the production of an additional unit of product A, we add to the total amount of product B produced by the business, A is complementary in production with B. . . . But if, in the production of an additional unit of product A, we end up producing less of product B, A is competitive in the production with B. . ." (95, pp. 33-34). Any two factors (inputs) or any two products (outputs) may be complementary or competitive. Thus, most retail farm supply firms for which fertilizer and agricultural chemicals are product lines are faced with additional dimensions other than those faced by the single product firm. The interrelationships among inputs and among outputs must be considered in applying economic conditions for the most profitable organization and operation of the business. Phillips gives three areas for which conditions must be specified for profit maximization:

1. For selection of the best combination of goods and services to provide.

2. For selection of the lowest possible cost combination inputs to produce these goods and services.

3. For selection of the most profitable level of production and size of the business. (95, p. 22)

In addition, dynamic models (i.e., considering time, value of money and uncertainty of the future) modify the application of necessary conditions of static models. Phillips presents and provides a very detailed discussion of the necessary conditions, competitive or complementary nature of inputs and outputs, and dynamic considerations (95). Because this is available, a detailed discussion will not be presented in this report.

From a societal viewpoint, a business firm might be evaluated in terms of the provision of goods and services and the effects on participating members rather than in terms of profits to the organization.

It is recognized that non-economic variables are important to the business firm. However, time and resource limitations place restrictions on the amount and kinds of data which a researcher can collect. Economic variables will be the focus of the study, because of the primacy of this goal for the business firm. In the previous quotation from Parsons, the last sentences add some support for this position:

> Thus, the value system of a business firm in our society is a version of 'economic rationality' which legitimizes the goal of economic production (specified to the requisite level of concreteness in terms of particular goods and services). Devotion of the organization (and hence the resources it controls) to production is legitimized as is the maintenance of the primacy of this goal over other functional interests which may arise within the organization. (88a, p. 68)

In addition, profit maximization as a goal will be assumed for certain of the variables. The reasons for this have been previously stated. Parsons states:

> For the business firm, money return is a primary measure and symbol of success and is thus part of the goal structure of the organization. But it cannot be the primary organization goal because profit-making is not by itself a function on behalf of the society as a system. (88a, p. 68)

It is assumed that changes in knowledge, attitudes and performance of the general manager and changes in the internal environment and activities of the firm will be reflected in the effectiveness and efficiency of the firm.

Based on the preceding discussion and the discussion of the training program, the theoretical proposition about outcomes for the social system will be restated. On page 99, this theoretical proposition was stated as: Individuals participating in training programs will have greater changes (direction predicted) in the outcomes of their occupational social system than will similar individuals not participating in the same training program. This theoretical proposition is restated in the next three general hypotheses which have reference to the total business, the fertilizer department and the agricultural chemicals department.

General hypothesis 5: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the economic returns to the entire business operations than will similar general managers not participating in the same training program.

Economic returns in this study will be defined in terms of total net sales, total gross commodity margins, total net operating revenue, indicators of profit maximization and some of the more common ratios used for testing the profitability of the business firm.

Total net commodity sales are total gross commodity sales minus cash discounts and returned merchandise. Total gross commodity margins are total net sales minus cost of goods sold.

Total net operating revenue is total gross commodity margins plus total net service revenue. Total net service income includes the net income from activities such as storage, handling, fertilizer spreading and application, grinding, mixing, drying and equipment rental.

Investment income is excluded from revenue to the firm because this is the area in which the general manager probably has the least impact. Also, in a profit maximization framework, the assumption of unlimited capital is needed. In some cases, returns to investments may not reflect the current management of the local firm. The decisions about investments which are yielding returns at the present time may have been made by persons other than the current general managers and boards of directors. External patronage refunds and other similar income are excluded because the level and rate of returns are exogenous to the firm. Members of other social systems have made the decisions about the level and rate of these returns.

Under various assumptions, measures of profit maximization have been derived from the theory of the firm by Baumel (9,97). The number and type of variables, which a general manager must take as given, determines which measure is appropriate. For this study, both total net profits (total income minus total costs) and total net operating profits (total net operating revenue minus total production expenses) do not appear appropriate. Total net profit assumes unlimited capital and that the manager has control of outside investments. Total net operating profits assumes unlimited capital for operating investments and that manager has control of operating investments.

Three appropriate measures appear to be: 1) total net operating profits divided by total tangible operating assets, 2) total net operating profit divided by total fixed assets, and 3) total net operating revenue. Total net operating revenue is defined as previously stated. Total production expenses are those expenses incurred in the operation of the business such as those connected with payroll, utilities, advertising, supplies, truck repair and maintenance, depreciation, travel and conventions. Income tax is excluded because of differential payment rate based on economic structure of the business. Interest is excluded so that total production expenses can be determined on a comparable basis for different firms. Certain expenses (such as income tax and interest) are omitted because they are directly related to the principle activity of the business firm and to make the production expenses comparable (10,98). Total net operating profit is total net operating revenue minus total production expense. Total tangible operating assets are total tangible assets of the firm minus outside investments. Intangible assets include good will, ability to make profits, etc., for which it is very difficult to assign dollar values. Therefore, only tangible assets will be considered in this study. Total fixed assets include land, plant and equipment.

The degree of delegated authority determines which specific profit maximizing objective is appropriate for the manager. For this purpose, the discretionary variables which the manager may or may not be able to manipulate can be reduced to the inputs used by the firm because these inputs determine the types and levels of activities in which the firm engages[1] (97).

If the manager is given a fixed amount of capital (i.e., he can borrow no additional capital) and is able to make final decisions regarding current and fixed inputs, the profit maximizing objective for the manager is to maximize total net operating profits divided by total tangible operating assets[1] (97).

If the manager is able to change selected inputs (current inputs), then the profit maximizing objective for the manager is to maximize total net operating profits divided by total fixed assets[1] (9,97).

If the manager must take all inputs as given, then the manager would maximize profits by maximizing total net operating revenue[1] (97).

Some of the more common ratios used for testing the profitability (sometimes referred to as rule of thumb indicators) of the business firm will be used (98). The ratios to be used are not based on the profit maximizing assumption, but are more nearly satisficing types of ratios. They are commonly used in industry. The ratios to be used include: 1) total gross commodity margins divided by total net commodity sales, 2) total net operating revenue divided by total net commodity sales, and 3) total net operating profits divided by total net commodity sales. Another ratio based on the relationships between sales and expenses will be used--total production expense divided by total net commodity sales.

General hypothesis 6: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the economic returns to the fertilizer department than will similar general managers not participating in the same training program.

Economic returns to the fertilizer department in this study will be defined in terms of fertilizer sales, tons of fertilizer sold, fertilizer gross margins, fertilizer net revenue, fertilizer net profit and fertilizer net profit divided by fertilizer fixed assets.

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[1] Baumel, C. Phillip, Department of Economics, Iowa State University of Science and Technology, Ames, Iowa. Profit Maximizing Objectives. Private Communication. June, 1964.

Fertilizer net sales are fertilizer gross sales minus cash discounts, soil insecticides sold in fertilizer and returned merchandise.

Fertilizer net revenue is fertilizer gross margins (minus gross margins for soil insecticides in fertilizer) plus net fertilizer service revenue. Net service revenue includes the net income from activities connected with the fertilizer department such as spreading, application and soil testing. Soil insecticides in fertilizer are subtracted so that they can be included under chemical sales. Fertilizer gross margins are fertilizer net sales minus cost of goods sold.

Fertilizer fixed assets includes plant and equipment for the fertilizer department.

Fertilizer net profit is fertilizer net revenue minus fertilizer production expenses. Fertilizer production expenses are those operating expenses connected with the fertilizer department excluding income taxes and interest.

Ignoring the complementary and competitive relationships between the fertilizer department and the other departments of the business and assuming that the manager can make changes in current inputs, it is assumed that the profit maximizing objective for the manager will be measured by maximize fertilizer net profit divided by fertilizer fixed assets.

General hypothesis 7: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in agricultural chemicals sales than will similar general managers not participating in the same training program.

Agricultural chemicals sales are total agricultural chemicals sales including soil insecticides sold in fertilizer minus cash discounts and returned merchandise.

Chapter 4

METHODOLOGY

Introduction

The primary purpose of this chapter will be the development of the empirical measures designed to operationalize the theoretical concepts used in the statement of the general and supporting theoretical hypotheses. The first portion of the chapter will include discussions on: 1) expected changes for general managers and their business firms after participating in the Iowa State University training program, 2) the experimental design, and 3) the methods and procedures, including data collection, types of measures, scoring and analysis procedures. In the second portion, theoretical concepts will be specified and operationalized to specific empirical measures. The empirical hypotheses using these empirical measures will be stated in the findings section.

Training Program

The conducted training program is operationally defined as the Fertilizer-Chemicals Dealers Experimental Training Program conducted by Iowa State University and will be referred to as the training program. Content areas are operationally defined as those content areas in the training program sponsored by Iowa State University. The training program was discussed in the problem setting chapter of this thesis.

Expected Changes

Before presenting other sections of the methodology chapter, comments will be made to clarify changes which might be expected in the knowledge, attitude and performance of the general managers and in the activities of and outcomes for the business firm.

Desirable changes

Why is it desirable that general managers change their knowledge, attitudes and performance? Based on the theoretical discussion of the general manager's role in the business firm, the basic assumption is made that a certain level of knowledge, attitudes and performance is necessary if the general manager is to fulfill his responsibilities as a local retail farm supply dealer. In addition to being a source of supply for many goods and services used in agricultural production, individuals within the business provide information and materials to farmer customers about the products and services as well as their use. As pointed out in the introduction, problem setting and the theoretical chapters, the general manager's level of performance has implications for the total complex of agribusiness. General managers, such as fertilizer and agricultural chemicals dealers, are a part of a very complex distribution and communication system for fertilizer and agricultural chemicals. Based on previous research findings, there appears to be a wide range in knowledge about, attitudes toward and services provided in connection with fertilizer and agricultural chemicals (16,128). Improved efficiency and effectiveness of the local retail farm supply businesses have many implications for the businesses themselves as well as for their farmer customers and those industries which furnish farm supplies and related services. Certain content areas and certain materials were selected by the action committee for the training program instead of other possible content areas and materials. It was assumed by the action committee that those areas selected would be beneficial to the general managers in improving the operational management of the local retail farm supply business and this would be reflected in improved efficiency and effectiveness of the business. As pointed out, the members of the action committee represented many subject matter areas. The decisions made by committee members to include certain areas for training were based on: past research conducted in these fields; their past experiences with and their knowledge about the problem areas in these fields applicable to general managers; and guidance and advice received from sponsors and representatives of industry and the dealers in the training program. It is recognized that each dealer, each business firm and each community in which the firm operates is unique. The complexity of management in the business firm makes it improbable that the managers of several firms would need or would be able to use or attain exactly the same level of knowledge, attitudes or performance. As pointed out in the theoretical section, the opportunity for change is not the same for all general managers. Beginning levels of knowledge, attitudes and performance of the general managers as well as beginning levels of the operation of the businesses would influence the amount and type of changes made. Social and personal characteristics of the general manager, characteristics of the business firm and situations including relevant aspects of the physical and social environment would be factors influencing the changes as well as the relevancy of making particular changes. In other words, differential change may occur because of factors such as: the general manager's beginning knowledge, attitudes and performance; beginning resource levels of the business firms; the social structures of the business firms; beginning levels of output of the business firms; goals and objectives of the firm; competitive situation; and different potentials and opportunities for change regarding both the general managers and their business firms. Based on the general framework within which the training was offered, it was the responsibility of the general managers in their decision-making processes to select and use the information presented and materials provided which best served their needs and goals.

Educational result objective level E was to help general managers, as retail dealers, to assist in raising the farmer's level of use of fertilizer and agricultural chemicals in the respective trade areas to more nearly approach an economic optimum. Research objective level E was to determine the effectiveness of the general manager, as a retail dealer for fertilizer and agricultural chemicals, in increasing the level of fertilizer and agricultural chemicals use to more nearly approach an economic optimum. This implies that farmers as well as dealers could ultimately benefit from the training program if the sales of these products were increased along with improvement in related services including informational services. Therefore, dealer-customer relationship was considered in the process of selecting training content areas.

The training program included areas which might cause changes: 1) in knowledge and attitudes of the general manager, 2) in performance of the general manager, 3) in internal environment and activities of the business firm, and 4) in the outcomes for the business firm. All of these could be of ultimate benefit to farmers. Each of these objectives could be considered as an end-in-view. Yet, each of them could be conceived as a means to the succeeding objective. They are highly interrelated and changes in any one of these areas could influence changes in the others. In the general framework presented about human behavior, the influence of outcomes from past behavior on subsequent behavior was discussed. In the discussion about general managers and business firms, the flow regarding changes was discussed mainly in one direction. This was done because the area of interest was the influence of the training program. However, it is recognized that the flow changes could interact. For instance, a change in outcomes may be a motivating factor for the general manager to acquire additional knowledge, change an attitude or change performance. This report will not concentrate on the interrelatedness of change but, rather, did changes occur in certain specified areas.

Because of the size and complexity of the training program, it was impossible to obtain detailed measures in all content areas of the training program. Rather, changes which might possibly result from inputs in certain aspects of some of the broad content areas were measured. It is beyond the scope of this report to present an analysis of all data collected in the research phase of the project. The emphasis areas for knowledge, attitudes, performance, internal environment and activities of the firm and outcomes of the business firm have been discussed as the general and supporting hypotheses were stated. Limitation of funds prevented securing data on changes concerning the farmer customers of these businesses.

Reasonable to expect change

Is it reasonable to expect certain changes based on the concepts, content, methods and procedures used in the Iowa State University training program? In this report, the attempt is to measure the adequacy of the training only in terms of outcomes not in terms of analyzing training methods, procedures and processes per se. However, based on the methods, procedures and processes used in this specific training, is it reasonable for the trainer and researcher to expect that certain changes would occur? Before the researcher develops empirical measures to measure change, it appears logical that there should be an expectation that changes would occur. Some reasons that it appears reasonable to expect changes resulting from this training program will be presented in the following discussion.

Several of the reasons have already been presented in the discussion of the training program in the problem setting chapter and in the preceding discussion of why it is desirable for general managers to make certain changes. All of the persons making presentations had had previous experience in making presentations at educational type meetings. All of the Iowa State University staff members were subject matter specialists in their area and had had a great deal of experience in presenting materials to a wide range of audiences.

The persons making presentations used a wide range of recommended techniques and methods. Visual aids, slides, flannel boards, field demonstrations, homework, question and answer sessions, idea exchange, formal presentations and other techniques and methods were used. The majority of the meetings were basically conducted in a seminar atmosphere. A written summary of each presentation and related materials were provided the dealers.

Another approach to the question, is it reasonable to expect change, would be the consideration of the principles discussed in the learning and attitude formation and change sections of this report. Many of these have already been implied by the previous discussions about the training program. The training program drew heavily on the _past experience_ of both the general managers and the persons making presentations. It was assumed that the general managers had had sufficient past experience in their dealer-manager role to enable them to learn the materials presented to them. Past experience of the general managers and persons making the presentations served as guides for subject matter content and application to empirical or case examples. Attempts were made to _motivate_ the general managers in several ways. In contacts with the general managers prior to and during the actual training, they were informed of the benefits which they could derive from active participation in the training program. Present and potential use of fertilizer and agricultural chemicals were topic areas as well as characteristics of large volume fertilizer and agricultural chemical dealers. Attempts to motivate the general managers were made in the group sessions, by phone calls and letters, and in the individual contacts at their places of business. Presentations were made on farmers' expectations of fertilizer dealers, farmers' expectations of chemical dealers, methods for increasing efficiency and profit of the business and responsibility areas of the operational management. The above factors and the general atmosphere of the training program could influence _set_, _frame of reference_, _goals_ and _motivation_.

Some of the ways in which reinforcement was provided included: 1) immediate answers were given to questions the general managers asked; 2) review and repetition of the subject matter were presented; 3) integration of the training materials; 4) individual assistance to general managers; 5) visitations to their businesses at which time changes were discussed and viewed; 6) guidance was provided in working out case examples and homework assignments; 7) personal encouragement to managers in making and executing decisions resulting from participation in the training program; 8) sessions where the managers presented information to other managers about the changes that had been made and how these changes had worked; and 9) written materials provided for reading, clarification and reinforcement.

Based on the discussion about the planning, organizing and implementing the training program, it should have supplied a meaningful experience for the general managers. The information was presented by several different techniques and methods and should have been relevant. The information presented in the workshop was based on research findings, the experiences of the persons planning the workshop and the experiences with similar dealers by those making presentations. Several meetings were held by the educational committee to evaluate and integrate the presentations. After the workshop, the managers were involved in planning content areas through discussion sessions on content areas, interviews about interest areas, check sheets and meetings of their executive committee with the educational committee.

At the beginning of the training program, it is possible that there was little group influence on the participating managers. The managers probably did not view other members of the group as a reference group before they became involved; in fact, they did not even know who else was involved in the group. However, once the group began to be structured it may have served as a reference group. Those participating exposed their ideas, beliefs, values, etc. out of which certain group expectations emerged. Iowa State University and the Iowa State University staff probably became referents for the managers since the training was held on the University campus and conducted by Iowa State University staff members.

Another approach to the question, about whether it is reasonable to expect changes, would be the perceptions of the managers regarding the training program. The responses to three structured questions are presented in Table 1. In general the managers stated: they would recommend that another dealer (general manager) attend if presented with the opportunity, it was worth the time and effort to attend, and if they had it to do over again, they would participate.

Based on the preceding discussion, it appears that it is reasonable to expect changes to occur.

Although it may be reasonable to expect changes, there are several reasons why certain expected changes would not occur. There is a possibility that some of the principles taught may not have been the most relevant or certain germane principles may have been omitted. Difficulty may have been encountered by the general managers in transferring the training to their situations and businesses. Certain changes may have been made, but the

Table 1. Selected responses for three questions regarding the evaluation of training program

Question	Response	Frequency
After participating in the dealer training program, would you recommend to another dealer that he attend a similar training program?	Most certainly would	7
	Certainly would	1
	Probably would	0
	Probably would not	0
	Would not	0
	Total	8
Have the benefits from the training program been worth the time and effort which you have put into the training program?	Most certainly have	6
	Certainly have	2
	Probably have	0
	Probably have not	0
	Have not	0
	Total	8
Based on your experience with the training program, if you had it to do over again, would you still have agreed to participate in the program as you did in 1961?	Most certainly would	5
	Certainly would	3
	Probably would	0
	Probably would not	0
	Would not	0
	Total	8

research measures were not sensitive enough to detect the changes. The time period of the research may not have been long enough for certain major changes to be made and/or outcomes to have occurred.

Experimental Design

As pointed out in the theoretical section of this report, the major concern in this study is whether or not individuals participating in training programs make more changes in relevant aspects of their subsequent behavior and occupational social system than do similar individuals not participating in training programs. Because the training program was conducted over a period of three years, there are many other variables which may have influenced the subsequent behavior of the general managers as well as changes in the activities of and outcomes for the business firm.

The training program is only part of the experience and situational world of the general managers; therefore, the researcher should attempt to set up some type of controlled experiment. In an attempt to measure the impact of the training program, the effects of extraneous variables which might confound the results need to be minimized by some means. Controlling extraneous variables for experimental research conducted outside of controlled laboratory or classroom conditions presents several problems not encountered in the completely controlled situations. Many types of research must be conducted under field conditions in order to obtain the desired information. If training programs to improve the performance of an individual in his occupational social system are to be assessed, then it appears logical to conduct research concerning these programs under field conditions. Although it is impossible to control on all the variables which may have effects on the outcomes of the experiment, certain controls can be brought to bear in field experiments to assist in assessing the influence of the independent variable--the training program. One method is to have a treatment group (sample) and a control group (sample). Individuals can be matched on selected personal and social characteristics as well as variables relating to some of the relevant aspects of the physical and social environment.

As the number of variables used for pairing of cases increases more difficulty is encountered in obtaining a match pair. Although, the matching of individuals on a number of variables may not be accomplished to the degree where there is an ideal match, at least, similar individuals can be selected. Variables used for matching could be classified under three major headings: 1) personal and social characteristics of the individuals, 2) past and present situations for the individuals including relevant aspects of the social and physical environment, and 3) future situations for the individuals including relevant aspects of the social and physical environment. In field experiments conducted over a period of time, the researcher has no direct control over the variables in the last classification. However, to a degree, these variables are "controlled" by the original selection of similar individuals, with similar environments, thus, certain aspects of the environment during the experiment should be common whether the individual is in a treatment or a control group. For instance, general economic conditions in a given area would tend to be the same, although, they may be interpreted differently and responded to differently by individuals in that area. By using a treatment group and a control group, an attempt is made to remove to some extent the influence of extraneous variables in assessing the influence of the training program. These extraneous variables may influence change. However, if they influence both treatment and control groups to the same extent, it is still possible to determine the amount of change which can be attributed to the training program.

Matched pairs of general managers were selected for this experiment. The original basic design of the experiment was a randomized block design with two treatments (treatment and control) and eight blocks. In a t-test framework, this would be a paired observation experiment. From the matched pairs, a random assignment was made as to which general managers would be in the treatment and control groups. General managers in the treatment group were then involved in the training program conducted by Iowa State University. The control general managers did not participate in the training program conducted by Iowa State University.

Referring to the general and supporting hypotheses, _general managers participating_ is operationally defined as the selected group of general managers, for local retail farm supply businesses for which fertilizer and agricultural chemicals were product lines, who were involved in the training program conducted by Iowa State University. They will be referred to as treatment general managers. _General managers not participating_ is operationally defined as the selected group of general managers, for local retail farm supply businesses for which fertilizer and agricultural chemicals were product lines, who were not involved in the training program conducted by Iowa State University. They will be referred to as control general managers.

Because the experiment was conducted over a period of three years and because it is not possible to control on all variables which may influence the general managers in regard to the training program, it is recognized that there may have been changes which cannot be attributed to the Iowa State University training program. However, it is assumed that, due to the nature of the experimental design, these other variables would be randomly distributed over all general managers. It is assumed that the training program is the unique variable which was applied only to the general managers in the treatment group.

In the selection of general managers for the treatment and control groups, the educational and research committees for the training program used variables which could be classified under the following headings: 1) general criteria, 2) external environment, 3) characteristics of the business firms, and 4) characteristics of the general managers.

The following general criteria were considered in the selection of the general managers:

1. They should be general managers of local retail farm supply businesses for which both fertilizer and agricultural chemicals were product lines.

2. They should be general managers of local retail farm supply businesses in which fertilizer sales volume was $15,000 or over for 1960 (the year preceding the research study).

3. They should be general managers of established local retail farm supply businesses.

4. They should be willing to cooperate with those conducting the training in the carrying out of the program.

Certain variables concerning the external environment were considered in the selection of general managers. Economic and agronomic variables were considered in the selection of a relatively homogenous area. Although social variables per se were not specified, it was assumed that the selection of a similar type area in Iowa would imply that many aspects of the social environment would be similar. It was decided that the businesses should be located in an area that was relatively homogeneous in regard to the type of farming, present and potential use patterns of fertilizer and agricultural chemicals and agronomic characteristics. The use of such an area would make it possible to eliminate many general situational variables which could cause the findings to differ between the treatment and control groups.

The cash-grain area of north central Iowa meets these criteria for homogeneity. It is one of the areas where the state is divided into areas based on major type of farming. By soil type classification it is the Clarion-Webster Soil Association. It is relatively homogeneous regarding agronomic characteristics such as soil type, climate and length of growing season.

From this general area, a block of nine counties was selected for this study. Agronomic characteristics, present and potential use patterns of fertilizer and agricultural chemicals, number and classification of commercial farms and type of farming were considered in the selection of the block of nine counties. Census data were used as basis for certain variables used in the selection process. Extension specialists in agronomy, plant pathology, entomology, farm management and sociology also were involved in the delineations.

From this nine-county area, six counties were selected for a reconnaissance survey. In these six counties, all of the general managers of retail farm supply businesses (retail dealers) who met the general criteria for selection were interviewed. Fifty-four dealers met these criteria. Data from this reconnaissance survey were used to obtain the matched pairs of general managers (retail dealers). The first step in the selection process was to classify the business by economic structure (type of ownership). Using selected variables matched pairs of general managers were made. In Table 2, the number of managers interviewed and the number of matched pairs by type of ownership are presented.

Variables on which the selection and matching were based included: 1) major product line, 2) percent of fertilizer of total sales volume, 3) percent of agricultural chemicals of total sales volume, 4) total business volume, 5) fertilizer sales volume, 6) agricultural chemicals sales volume, 7) general manager's evaluation of the importance of fertilizer to the business, 8) general manager's perception of plans for the fertilizer department,

Table 2. Type of ownership of business

Type of ownership	Businesses No.	Businesses %	Matched pairs No.	Matched pairs %
Privately owned, including partnerships or family corporations	16	29.6	2	25.0
Farm Service (Farm Bureau) Companies	4	7.4	1	12.5
Line Corporations	3	5.6	1	12.5
Cooperatives	31	57.4	4	50.0
	54	100.0	8	100.0

9) general manager's evaluation of the importance of agricultural chemicals to the business, 10) general manager's perception of plans for the agricultural chemical department, 11) number of years which general manager had sold fertilizer, 12) number of years which general manager had sold agricultural chemicals, 13) types of fertilizer sold, 14) number of employees, 15) general manager's years of formal education, and 16) general manager's age. Also, it was decided that in selecting matched treatment and control pairs of general managers the overlap of trade territories would be kept at a minimum. A summary of the selection and matching variables is presented in Tables 3 to 8.

Another variable considered in the selection and matching of dealers was an indication of the general manager's willingness to participate in the training session. A structured question was used. The general managers were asked to select from the five responses listed in Table 9 the one that best applied to their willingness to attend. The question was, "If you had an opportunity to attend a week long training program devoted to training in basic business management practices and sales techniques as well as product information on fertilizer and agricultural chemicals would you ______ such a meeting?"

Using the selection and matching variables listed, eight matched pairs of general managers were selected. They included one pair of family

Table 3. Major product line, percent fertilizer of total sales, percent chemicals of total sales

Variable	54 dealers No.	54 dealers %	Treatment No.	Treatment %	Control No.	Control %
Major product line						
Grain	40	74.1	7	70.0	7	87.5
Feed	3	5.6	2	20.0	0	0.0
Petroleum	4	7.4	1	10.0	1	12.5
Fertilizer	5	9.3	0	0.0	0	0.0
Other	2	3.7	0	0.0	0	0.0
Total	54	100.1	10	100.0	8	100.0
Percent fertilizer of total sales						
Less than 5 percent	19	35.2	4	40.0	2	25.0
5-9 percent	13	24.1	2	20.0	3	37.5
10-14 percent	5	9.3	1	10.0	2	25.0
15-49 percent	10	18.5	3	30.0	1	12.5
Over 50 percent	4	7.4	0	0.0	0	0.0
No answer, don't know	3	5.6	0	0.0	0	0.0
Total	54	100.1	10	100.0	8	100.0
Percent chemicals of total sales						
Less than 1 percent	31	57.4	2	20.0	2	25.0
1.0 - 1.99 percent	5	9.3	1	10.0	3	37.5
2-5 percent	12	22.2	3	30.0	0	0.0
Over 5 percent	3	5.6	0	0.0	0	0.0
No answer, don't know	3	5.6	4	40.0	3	37.5
Total	54	100.1	10	100.0	8	100.0

Table 4. Total business volume, fertilizer sales volume, and chemical sales volume

Variable	54 dealers		Treatment		Control	
	No.	%	No.	%	No.	%
Total business volume						
Less than $200,000	5	9.3	1	10.0	1	12.5
$200,000-$600,000	12	22.2	1	10.0	1	12.5
$601,000-$1,000,000	17	31.5	4	40.0	4	50.0
Over $1,000,000	17	31.5	4	40.0	2	25.0
No answer	3	5.6	0	0.0	0	0.0
Total	54	100.1	10	100.0	8	100.0
Fertilizer sales volume						
$15,000-$24,999	9	16.7	2	20.0	2	25.0
$25,000-$39,999	16	29.6	2	20.0	2	25.0
$40,000-$64,999	11	20.4	2	20.0	1	12.5
$65,000-$89,999	7	13.0	2	20.0	1	12.5
$90,000 and over	11	20.4	2	20.0	2	25.0
Total	54	100.1	10	100.0	8	100.0
Agricultural chemicals sales volume						
Less than $1,000	5	9.3	1	10.0	2	25.0
$1,000-$2,499	10	18.5	4	40.0	2	25.0
$2,500-$4,999	13	24.1	2	20.0	2	25.0
$5,000-$9,999	9	16.7	1	10.0	0	0.0
$10,000 and over	13	24.1	2	20.0	2	25.0
No answer, don't know	4	7.4	0	0.0	0	0.0
Total	54	100.1	10	100.0	8	100.0

Table 5. Evaluation of the importance of fertilizer, plans for fertilizer department

Variable	54 dealers No.	54 dealers %	Treatment No.	Treatment %	Control No.	Control %
Evaluation of the importance of fertilizer						
A good money maker	24	44.4	5	50.0	5	62.5
An important service to bring into business	14	25.9	4	40.0	3	37.5
Just another customer service	8	14.8	0	0.0	0	0.0
Not a money maker, but have to carry to compete with other businesses	6	11.1	1	10.0	0	0.0
No answer	2	3.7	0	0.0	0	0.0
Total	54	99.9	10	100.0	8	100.0
Plans for fertilizer department						
Plan to expand it greatly	9	16.7	2	20.0	0	0.0
Plan to expand it somewhat	25	46.3	5	50.0	6	75.0
Plan to keep up with increased but keep fertilizer at about the same percent of the total business	16	29.6	3	30.0	2	25.0
Plan to reduce the fertilizer end of the business	1	1.9	0	0.0	0	0.0
Plan to get out of fertilizer altogether	1	1.9	0	0.0	0	0.0
No answer	2	3.7	0	0.0	0	0.0
Total	54	100.1	10	100.0	8	100.0

Table 6. Evaluation of the importance of chemicals, plans for the chemical department

Variable	54 dealers		Treatment		Control	
	No.	%	No.	%	No.	%
Evaluation of the importance of chemicals						
A good money maker	17	31.5	5	50.0	3	37.5
An important service to bring into business	16	29.6	4	40.0	2	25.0
Just another customer service	13	24.1	1	10.0	1	12.5
Not a money maker, but have to carry to compete with other businesses	4	7.4	0	0.0	2	25.0
No answer	4	7.4	0	0.0	0	0.0
Total	54	100.0	10	100.0	8	100.0
Plans for chemical department						
Plan to expand it greatly	7	13.0	1	10.0	1	12.5
Plan to expand it somewhat	23	42.6	4	40.0	2	25.0
Plan to keep up with increased demand but keep fertilizer at about the same percent of the total business	19	35.2	5	50.0	4	50.0
Plan to reduce or get out of the business or was not in the business at the time of the interview	5	9.3	0	0.0	1	12.5
Total	54	100.1	10	100.0	8	100.0

Table 7. Number of years selling agricultural chemicals, number of years selling fertilizer, types of fertilizer sold

Variable	54 dealers		Treatment		Control	
	No.	%	No.	%	No.	%
Number of years selling agricultural chemicals						
5 years or less	10	18.5	0	0.0	1	12.5
6-10 years	17	31.5	5	50.0	4	50.0
11-15 years	19	35.2	5	50.0	2	25.0
Over 15 years	4	7.4	0	0.0	1	12.5
No answer	4	7.4	0	0.0	0	0.0
Total	54	100.0	10	100.0	8	100.0
Number of years selling fertilizer						
5 years or less	6	11.1	1	10.0	0	0.0
6-10 years	14	25.9	5	50.0	3	37.5
11-15 years	16	29.6	2	20.0	1	12.5
Over 15 years	15	27.8	2	20.0	4	50.0
No answer, don't know	3	5.6	0	0.0	0	0.0
Total	54	100.0	10	100.0	8	100.0
Types of fertilizer sold						
Bagged	53	98.1	10	100.0	8	100.0
Bulk	48	88.9	9	90.0	8	100.0
(Own spreading equip.)	(20)	(37.0)	(4)	(40.0)	(4)	(50.0)
(Hire spreading equip.)	(28)	(51.9)	(5)	(50.0)	(4)	(50.0)
Liquid	21	38.9	7	70.0	3	37.5
Anhydrous ammonia	2	3.7	0	0.0	2	25.0

Table 8. Years of formal education, age, number of employees

Variable	54 dealers		Treatment		Control	
	No.	%	No.	%	No.	%
Number of employees						
Less than 5	15	27.8	3	30.0	2	25.0
5-10	27	50.0	5	50.0	4	50.0
More than 10	10	18.5	2	20.0	2	25.0
No answer	2	3.7	0	0.0	0	0.0
Total	54	100.0	10	100.0	8	100.0
Years of formal education						
12 years or less	36	66.7	6	60.0	5	62.5
13-15 years	12	22.2	2	20.0	3	37.5
16 or more	5	9.3	2	20.0	0	0.0
No answer	1	1.9	0	0.0	0	0.0
Total	54	100.1	10	100.0	8	100.0
Age						
Under 30	11	20.4	1	10.0	2	25.0
30-39	16	29.6	5	50.0	0	0.0
40-49	15	27.8	2	20.0	3	37.5
50-59	11	20.4	2	20.0	3	37.5
No answer	1	1.9	0	0.0	0	0.0
Total	54	100.1	10	100.0	8	100.0

Table 9. Willingness to attend week long training program

Response	54 managers		Treatment managers		Control managers	
	No.	%	No.	%	No.	%
Most certainly attend	12	22.2	3	30.0	1	12.5
Certainly attend	15	27.8	3	30.0	4	50.0
Probably attend	21	38.9	3	30.0	3	37.5
Probably not attend	3	5.6	1	10.0	0	0.0
Certainly not attend	0	0.0	0	0.0	0	0.0
No answer	3	5.6	0	0.0	0	0.0
Total	54	100.1	10	100.0	8	100.0

corporations, one pair of private corporations, one pair of Farm Service (Farm Bureau) companies, one pair of line corporations (Quaker Oats), and four pairs of cooperatives based on the size of the business. Six alternate treatment general managers were selected to replace the first choice treatment general managers if it became necessary. It was not possible to find alternates for two of the treatment general managers. Of the eight treatment general managers and six alternate general managers, ten agreed to participate in the training program, including at least one in each matched pair.

There were ten treatment general managers and eight control general managers, for a total of eight matched pairs, at the time the training program started. For various reasons, but mainly due to the change of general managers within some of the businesses, there were only four matched pairs left intact at the end of the three year training period; although, there was a total of eight treatment and five control general managers still in the research project. The four intact pairs included one pair of Farm Service companies and three pairs of cooperatives. The remaining four treatment general managers included one alternate treatment manager for a cooperative, an owner and general manager for a privately owned business, one alternate treatment manager for a line corporation, and a treatment manager for the line corporation. The fifth control general manager still in the research project at the end of the training period was a cooperative manager.

During the three year experimental period, one private and one cooperative treatment general managers and two private and one line corporation control general managers were "lost," due to the managers changing jobs, the business being sold, and by a business changing business structure. Thus, the inherent dangers of using experimental designs involving matched pairs, small numbers and extended time periods within a dynamic society were made manifest.

Method and Procedures

In this section the general methods and procedures for obtaining scoring and analyzing various types of measures will be discussed. The topic areas included in this discussion are: 1) data collection, 2) research measures, 3) general analysis procedures, 4) open-end questions, 5) frame of reference questions, 6) performance questions, 7) service questions, and 8) financial data.

Data collection

As a part of this research project certain information was collected from both the treatment and control general managers. This included: 1) the collection of financial and factual information about the general managers' businesses; 2) opinions on matters pertaining to their business operations; 3) answers to questions which would test dealers' knowledge and attitudes in the areas of management, fertilizer and agricultural chemicals; and 4) answers to questions pertaining to their actions and activities related to operational management.

The primary method of data collection was personal interviews with the general managers. Some information was obtained from both the treatment and control groups of general managers during the initial reconnaissance survey. The majority of the data was obtained in three intensive interviews. The first of these interviews was conducted in early 1961, shortly before the training program was started for the treatment dealers. An interim interview was conducted in March, 1962 and the final data were obtained in the fall of 1963.

Because these interviews were intensive there was, no doubt, some effect of the interviewing on future action taken by the control dealers as well as the treatment dealers. However, since both groups were interviewed, it is assumed that the influence of the interviews was similar for both treatment and control groups.

A random sample of farmers from the trade area of each treatment and control general manager was interviewed in 1961 to obtain information about: 1) use patterns for fertilizer and agricultural chemicals, 2) attitudes and opinions concerning fertilizer and agricultural chemicals, 3) farmers' information sources for fertilizer and agricultural chemicals, 4) farmers' expectations of their fertilizer and agricultural chemical dealers, 5) factors which farmers believe limit their use of fertilizer and agricultural chemicals, and 6) farmers' purchase patterns for fertilizer and agricultural chemicals (20).

The samples of farmers were drawn from the customer lists of the general managers. The information obtained from this phase of the project will be referred to in discussing the relevancy of certain empirical measures and in assigning scores to general managers' responses to certain questions.

Research measures

As discussed previously, certain changes might be expected in the dealers and their businesses as a result of the training program. If treatment dealers were recipients of these inputs and control dealers were not, and the treatment dealers acted positively on these inputs, then the predicted change should have taken place in the treatment dealers.

Previous research studies, conducted with a larger number of similar types of dealers (16,18,128) in which some of the same measures were used, can serve as references for comparison purposes.

The basic experimental design used in this study is of the before-after type. It consists of one treatment and one control group of dealers who were matched by pairs and from whom measures were obtained before and after the exposure of the treatment dealers to the experimental or independent variable. However, within this basic experimental design there are other types of measures and the relationship of these measures to the study will also be explained.

Many of the measures are of the before-after type or are variations of this type about which the same general inferences can be made. The variations come about as a result of some measures being interim measures, making interim-after and before-interim-after variations of the more general before-after type of measures.

In the before-after type of experimental design, evidence of the effect of the independent variable on the dependent variable can be determined by comparing the change in the dependent variable in the treatment dealers with the change in the dependent variable in the control dealers.

Use of before measures, as well as randomization of selection of dealers (within matched pairs) which would indicate that initial positions should not have differed more than chance, would allow one to infer that differences in the after measures are due to the training program. As previously stated, the measuring process itself, in this case the interviewing, may have affected the characteristics being measured, especially regarding before and after measures, but also in regard to any other type of measures used. The reason is that the general influence of the interview may have affected any and all answers given, wheither the specific question was asked previously or not. It is, however, assumed that the effect of the measuring process is equivalent for both treatment and control groups of dealers.

Some of the measures used to support hypotheses are questions which were asked of the dealers after the training program only. Since the matched pairs of dealers were selected on the basis of some similar characteristics, it is assumed that differences in after answers reflect the influence of the training program. Similarity of data derived from questions asked before in the same general area, even though the specific question was not asked before, would also help to establish an inferred benchmark and allow one to infer that differences in the dependent variable are a result of the training program.

Another measure of change is the dealers' perception of change that has taken place. Several of the questions were worded in such a way that the dealers could indicate on a continuum the degree of change which they perceived had taken place in themselves and within their businesses during the training period. The treatment dealers were also asked to indicate their perception of the effect of the training program on certain changes in themselves and their businesses.

Working with a small sample has some features which are not found in a large sample. One feature is the chance for personal acquaintance with the individual participant. In this project, some members of the research committee became personally acquainted with the treatment dealers. This acquaintance was made through the training sessions, through personal conversations with some of the dealers and through interviewing. It was possible, through interviewing both treatment and control dealers, to gain insights which were not recorded as formal measures. These types of "participant observer" insights can be useful in making inferences from dealers' actions or statements.

Following is a summary of the various types of measures used in the study along with an analysis of their strengths and weaknesses.

Measures	Dealers interviewed	Time asked Before (1961)	 Interim (1962)	 After (1963)
Interview schedules				
1.	Treatment and control	X	X	X
2.	Treatment and control	X		X
3.	Treatment and control		X	X
4.	Treatment and control			X
5.	Treatment only (evaluation)			X
Participant observation				
6.	Treatment and control	X	X	X

Types of measures Nos. 1, 2, and 3 also included some questions which were asked before and/or interim, but which were not asked in the after interview. While the answers to such questions cannot be used to measure change during the entire training period, they can be used to check the similarity of the dealers in some areas.

Each of these types of measures has certain strengths and weaknesses.

Type 1 measures are questions which were asked before, interim and after the training period. This provides a measure of change over a period of time and gives some indication of the rate of change. It also gives some indication of the point in time that the change took place and provides a means for measuring and comparing both treatment and control dealers. It is recognized, however, that the two and one-half year period of time between which the before and after answers were obtained may have been insufficient time for change to have occurred in some areas. It may also be difficult to explain an interim answer which does not fall between the before and after answers.

Type 2 measures are questions which were asked before and after the training period. The same strengths and weaknesses apply to this type as to Type 1 measures except that without interim answers, there is no indication of the point in time (during the period under consideration) when the change took place; nor is it possible to know if the change was linear.

Type 3 measures are questions which were asked interim and after. They measure change over a period of time of both groups of dealers. However, the period of time is shorter than in the two previously discussed types and changes may have taken place before the interim measures were made. If this was the case, there would be no way of measuring this previous change nor of measuring the influence of the training program on change up to the interim point.

Type 4 measures are questions which were asked of both treatment and control dealers after the training period only. There are several possible reasons why these questions were asked at that time only. Some questions were not asked before the training period because the interview possibly would have influenced future answers to a great extent. Other questions, such as those concerning perception of change, could not have been asked before the training period. In some cases, it could not be anticipated that certain areas would become important during the training program. Although, this type of measure is not as useful as Types 1-3 in measuring change, it can still be a useful tool in data analysis, assuming that there was original similarity in matched pairs of dealers. Some measures of this type called for dealers to indicate their perception of changes over the time interval during which the training was conducted; this would help offset, to some extent, the weakness of this measure being taken at only one point in time.

Type 5 measures are questions which were asked of treatment dealers only. These questions deal with the effect of the training program on changes which the treatment dealers perceived that they had made. Treatment dealers were also asked to evaluate the training program. Answers from these questions are useful to help substantiate or refute apparent training program influences inferred from other measures.

Treatment dealers might, however, not have perceived that some changes which had taken place during the training period were due to the influence of the training program when they, in fact, were. Or, due to a change in their frame of erference which was brought about by the training program or some other means, they might not have perceived that a change had taken place when it actually had. A possible weakness in all measures of this kind, but perhaps more so in this one, is the tendency which dealers may have to give answers which they perceive will please the interviewer and the training program staff.

Type 6 measures are observations which were made by those research staff members who were involved in planning and conducting this study. They are useful to the extent that they can be substantiating evidence or can provide answers to questions which were not formally asked in an interview.

Analysis procedures - general

As mentioned in the section on design of the experiment, only four matched pairs were intact at the end of the experiment. Various alternatives were considered to analyze the data collected on treatment and control general managers. Economic data were available through December 31, 1962 for nine treatment general managers and six control general managers. These data were obtained from business records. Therefore, even if the manager had left for another job in 1963, the data could still be obtained. On knowledge, attitude and performance variables, data were available for eight treatment dealers and five control dealers. This is the number of general managers interviewed during the 1963 interviewing.

Some of the alternatives considered were: 1) analyze noneconomic variables for the four intact pairs remaining in the fall of 1963 and analyze the economic variables for the six intact pairs remaining December 31, 1962; 2) assume a design with two groups without matching of pairs and analyze data on noneconomic variables for eight treatment and five control and on economic variables for nine treatment and six control; 3) use statistical tests for analyzing the data for either alternative 1 or 2; 4) use no statistical tests and present only descriptive findings for either alternative 1 and 2. For this analysis, it was decided to use statistical tests for the majority of variables and to basically use a design with two groups without matching of pairs. Some reasons for doing this are presented in the following paragraphs.

As pointed out in the design of experiment section, an attempt was made to control on several environmental variables such as type of farming area, present and potential fertilizer use and agronomic characteristics. Therefore, whether one uses an experimental design with matched pairs or one without matched pairs, certain environment variables should be "relatively similar" for both treatment and control general managers.

The four general criteria used as a basis for a general manager to be included in the study either as a treatment or control narrowed the range of possible general managers for treatment and control general managers. From the matched pairs, a random assignment was made as to which dealers should be in the treatment and control groups. Therefore, the managers in treatment and control groups should be "relatively similar." It is realized that a manager leaving one of the groups during the period of the training program may lead to a difference in the two groups. Therefore, when possible, a statistical test will be made on beginning benchmark (before) variables to give an indication whether or not the two groups to be analyzed are different when the matching is ignored. For knowledge, attitude and performance variables this will be eight treatment and five control general managers. For economic variables, this will be nine treatment and six control general managers.

Certain techniques will also be used to, in part, "control" for beginning differences even though these differences between groups are not statistically significant. The scoring on certain variables will be based on 1) whether a change or no change was made and 2) on the amount of change. When the assumptions for covariance can be approximately met, analysis of covariance can be used to "control" on beginning differences. When pairing is based on several characteristics, there is difficulty in finding an "ideal" match pair. If the assumptions can be approximately met, analysis of covariance is sometimes used to control on beginning differences.

There are certain statistical problems involved in measuring and analyzing observations of a small sample size. One of the problems concerns the assumptions that are made in using statistical tests. With larger samples, a researcher is sometimes able to use a parametric test because of the law of large numbers and/or the central limit theorem. The law of large numbers essentially states that:

> . . . no matter what the population (as long as it has a finite variance), the distribution of the sample mean becomes more and more concentrated in the neighborhood of the population mean as the sample size is increased. (84, p. 71)

The central limit theorem essentially states that the distribution of means of random samples drawn from any population, provided that it has finite variance, approaches the normal distribution as sample size increases. How large a sample size is needed for the sampling distribution of the mean to approach normal distribution depends upon the form of the population distribution. One of the problems in very small samples is that there are not enough cases in the sample to obtain sufficient information about the form of the population distribution.

The use of a particular statistical test presupposes a certain level of measurement and certain assumptions about the mathematical model. In the analysis of data to test the empirical hypotheses, analysis of variance, t test analysis of covariance and the exact test for the difference between two proportions will be used. When the scale of measurement is not appropriate for analysis of variance, t test or analysis of covariance, the exact test for the difference between two proportions will be used. The procedures for the exact test are outlined in Edwards (34).

In regard to the assumptions for analysis of variance, Ostle states:

> Visual assumptions in analysis of variance involve the concepts of additivity, normality, homogeneity of variances and independence of the errors. (84, p. 338)

In regard to the assumptions for analysis of covariance, Winer states:

> All the assumptions underlying the usual analysis-of-variance approach are also required in the analysis of covariance. In addition, there are assumptions about the regression effects. First, it is assumed that treatment effects and regression effects are additive. Implicit in this is the assumption that regressions are homogeneous. Second, it is assumed that the residuals are normally and independently distributed with zero means and the same variance. Implicit in this is the assumption that the proper form of regression equation has been fitted. If a linear regression is used when the true regression is curvilinear, then the assumptions made with respect to the residuals will generally not hold. (134, p. 586)

If sufficient observations are available the assumptions about normality, additivity homogeneous variances, homogeneous regression co-efficients and independence can be checked by using techniques such as Bartlett's test for homogeneity of variances, an F test for homogeneity of variance when there are two samples, chi square test of goodness of fit, Tukey's test of additivity, an F test to determine if regression coefficients differ significantly and tests for randomness. If the assumptions are not closely approximated, transformation of the original data sometimes will provide a closer approximation to the mathematical model. In some cases, theory and experience indicate a transformation and in others the experimental data need to be partially analyzed to determine if a transformation is needed and/or to determine the appropriate transformation. In the analysis of data to test the empirical hypotheses, transformations, if possible, will be made in those cases where it appears that a closer approximation of the mathematical model will be obtained. However, sometimes it is not possible to make a transformation.

For certain economic variables, the means and standard deviations were proportional. This indicates a logarithmic transformation. However, in the case of profits some minus values were present. If a value is added so that the logarithmic transformation can be made, then the amount of this value is reflected in the analysis of variance or analysis of covariance.

Because of the small sample size, it is difficult to determine just how well the assumptions for analysis of variance and analysis of covariance are approximated. However, the F tests in analysis of variance and analysis of covariance are robust. Robust refers to the fact that the F tests in both techniques are relatively insensitive to certain departures from the assumptions. For analysis of variance, Ostle states:

> In general, the consequences are not serious when the assumptions made in connection with analyses of variance are not strictly satisfied. That is, moderate departures from the conditions specified by the assumptions need not alarm us. For example, minor deviations from normality and/or some degree of heteroschedasticity (lack of homogeneity of variances) will have little effect on the usual tests and the resulting references. In summary, the analysis of variance technique is quite robust, and thus the researcher can rely on its doing a good job under most circumstances. (84, p. 339)

For analysis of covariance, Winer states:

> Evidence from the usual analysis of variance indicated that F tests in the analysis of covariance are robust with respect to the violation of the two assumptions, normality and homogeneity of the residual variance. The effect of nonhomogeneity of within-class regression, which is analogous to lack of additivity, has not been studied. (134, p. 586)

Therefore, analysis of variance and analysis of covariance will be used when it appears that the approximation is close enough to justify using them. The t test will also be used. With one degree of freedom in the numerator for the F test, $t^2 = F$. However, the reader is cautioned to keep in mind the small sample size. Certain limitations in the analysis of data as well as the results obtained are examined in the findings chapter.

The procedures for analysis of variance and analysis of covariance for the various designs assumed in this report are discussed in Winer (134) and Ostle (84). Because of the different types of measures used in this project, various procedures and techniques are used in the analysis of the data. The analysis procedures are discussed in more detail under the next set of subheadings which specify the scoring and analysis procedures for certain types of measures.

For the purposes of this study, many of the general level concepts are operationalized by a group or cluster of attributes, performances or dimensions which are logically consistent with the general level concept. This kind of operationalization places emphasis upon construct validity in establishing the relationship between the empirical measures and the theoretical concept. The relationship between the theoretical concept and the empirical measure of that concept is sometimes referred to as an epistemic correlation (82). Because of the small sample size, estimation of the reliability (in the cases that it is applicable) of the construct measures will not be included. However, several of the constructed measures used in this study were developed in previous research studies with larger sample sizes. In these studies, estimates of the reliability of the constructed measures were obtained. The logic and rationale will be briefly presented for the way in which each theoretical concept is operationalized.

Open-end questions

Open end questions were included under each of the six types of measures previously discussed. General managers were asked to reply to these questions in their own words. To score these answers as objectively as possible, three judges were used to evaluate the responses. These judges were all members of the research staff which planned and carried out the training program, and they were acquainted with the materials which had been presented. They judged the answers to the open-end questions without knowledge of which general manager gave which response. From this evaluation of the general manager's answers to the open-end questions, scores were obtained.

Frame of reference questions

The response of the general manager to certain structured questions could vary in the before (1961) and after (1963) interviews because the frame of reference of the general manager had changed during this time period. As a partial method of determining if the 1963 response was the same or different than the 1961 response, the respondent was asked supplemental questions to determine if a change had occurred or if their frame of reference had changed. For instance, the general managers were asked if they felt that they had adequate information to provide farmers with technical information about fertilizer and fertilizer use. They responded by choosing one of four available answers ranging from "completely adequate" to "very inadequate." These answers were scored from 3 to 0 respectively. The general managers were asked this question during both the before and after interviews. If their answer was the _same_ both times they were then asked if they felt that their information in 1963 was much more, more, about the same, less, or much less adequate than in 1961. If they answered much more or more, their 1963 score was adjusted to show an increase. If they answered the same, the 1963 score was not adjusted. If they answered less or much less, their 1963 score was adjusted so that it was less than the 1961 score.

If a manager's answer to the question in 1963 indicated less adequacy than in 1961, they were questioned as to the reason for this change. If they stated that they actually felt that they had less adequate information in 1963 than in 1961 no adjustment was made in their 1963 score. However, if they felt that they had just as adequate or more adequate information in 1963, but their answer indicated less adequacy in 1963 than in 1961, this was adjusted if they indicated they now realized that what they perceived as being adequate in 1961 was really less than adequate. The above adjustments were made in the 1963 score to allow for a change in frame of reference the general manager may have had over the training period.

Using the above procedures, the cell frequencies for a 2 X 2 table can be obtained. The responses are dichotomized on one axis by "increased" and "did not increase." The classification for the other axis is treatment or control.

The exact test for the difference between two proportions will be used in the analysis chapter to determine if the differences are statistically significant (34).

_Performance questions_*

Based on a general manager's response to a question about procedures used in a given area, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used would lead to successful performance of the specified function(s). Each judge was instructed to compare the response of a general manager to his (the judge's) standard of adequate procedures for a general manager which should lead to successful performance of the specified function(s). If the judge believed that the response indicated that the procedures used by the manager would most certainly lead to completely adequate performance of the specified function(s), he was instructed to assign a score of 99. On the other hand, if the judge believed that the response indicated that the procedures used by the manager would most certainly lead to completely inadequate performance of the specified function(s), he was instructed to assign a score of 1. A judge could use any point (number) on the continuum (1-99) in scoring a response. The judges scored the responses to the questions without knowledge of which general manager gave the response. Based on the theoretical development of this method, the scores were coded by using a normal transformation with 99 being coded as +2.326, 85 as +1.036, 70 as +0.524, 50 as 0.000, 30 as -0.524, 15 as -1.036 and 01 as -2.326 (135). The coded scores were summed and the mean was determined by dividing the sum by the number of judges.

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*Wolins, Leroy, Department of Statistics, Iowa State University, Ames, Iowa. Scoring and analysis procedures for performance questions. Private communication. April, 1965.

If the question was asked both before (1961) and after (1963), analysis of covariance will be used to test the empirical hypothesis. For a question asked only after (1963), analysis of variance will be used.

Services questions

To obtain measures of the general managers' behavior related to various services and promotional activities connected with the fertilizer department, the general managers were asked if certain services were provided for their farmer customers during 1960, 1961 and 1963. The services were classified under the following headings: 1) soil testing and related services, 2) educational services, 3) direct selling, 4) pricing and discount, 5) advertising and promotion, and 6) fertilizer application services. Under each of the major headings, three to five specific services or activities were listed. In 1960, the beginning benchmark year, the general managers were asked which of the specific services or activities were provided for their farmer customers. No measure was obtained of the intensity to which the service or activity was provided. During March of 1962, the general managers were asked which services and activities were provided during 1961, the first year of the training program. To obtain a measure of intensity, the general managers were asked to indicate how the intensity of use of each service or activity provided in 1961 compared to the use in 1960. During the fall of 1963, the general managers were asked which services were offered in 1963 and to indicate how the intensity of use of each service or activity provided in 1963 compared to the use in 1960. For 1960, a score of 1 was given for each service or activity provided and a score of 0 if the service or activity was not provided. Under each of the six major headings listed above, the scores were summed with the possible range of scores under each major heading from 0 to 5 depending on the number of specific services listed under the heading. The scoring for the services in 1961 and 1963 was based on whether or not the service was offered in 1960 and the general manager's perception of the amount of change in the use of the service as compared to the beginning benchmark year, 1960. For each service or activity, a score based on the amount of change as perceived by the general manager was obtained for both 1961 and 1963. If the service was not provided during 1960, 1961, or 1963, a score of 0 was given for both 1961 and 1963. This indicated no change in providing the service or activity. If the service or activity was not provided in 1960 but provided in 1961 and/or 1963: a) a score of 1 was given if a service was offered at a minimum level and b) a score of 3 was given if the service was provided more intensively. The scoring was as follows if the service was offered in 1960: a) a score of -3 was given if the service was not provided during 1961 and/or 1963; b) a score of -1 was given if provided less during 1961 and/or 1963; c) a score of 0 was given if provided the same in 1961 and/or 1963--indicating no change; d) a score of +1 was given if provided a little more in 1961 and/or 1963 and e) a score of +3 was given if provided much more in 1961 and/or 1963. For instance, if a service was not offered in 1960, offered little during 1961 and offered much in 1963, the scoring would be 1 for 1961 and 3 for 1963. If a service was offered in 1960, offered a little more in 1961 and offered much more in 1963, the scoring would be 1 for 1961 and 3 for 1963. Each service or activity under a major heading was scored for 1961 and 1963 and these individual service or activity scores were summed to obtain a total score for the major heading of services.

Because the 1961 and 1963 scores are based on the services or activities provided during the beginning benchmark year, 1960, a covariate will not be used. The analysis of data will follow the procedures which Winer outlines for a two-factor experiment with repeated measures on one of the factors. Treatment or control will be considered as factor A and years as factor B. Repeated measures on factor B indicate that each experimental unit, general managers, is observed under all levels of factor B, years 1961 and 1963 (134, p. 298). Because of the unequal group size, an unweighted-means solution will be used.

Financial data*

For the purposes of this study, the concept, economic returns, is not operationalized through a single measure, but by several measures representing various dimensions of the general level concept. The measures of economic returns included in this research include: total commodity sales, total gross commodity margins, total net operating revenue, total net operating profit, ratio of total net operating profits to total tangible operating assets, ratio of total net operating profits to total fixed assets, ratio of gross commodity margins to total net commodity sales, ratio of total net operating revenue to total net commodity sales, ratio of net operating profits to total net commodity sales, ratio of total production expense to net commodity sales, fertilizer net sales, tons of fertilizer sold, fertilizer net revenue, ratio of fertilizer net profits to fertilizer fixed assets. The general computational procedures for obtaining these measures will be discussed in this section. More detail will be given as each measure is discussed later in this chapter. The rationale for the specific measures of economic returns was presented in the theoretical chapter. Several problems were encountered in computing the economic measures.

Differences in the fiscal years of the businesses for the general managers and variations in bookkeeping systems required the collection of income and expense figures on a monthly basis as well as on a departmental and item breakdown. The original collection of data was on a fiscal year basis. Therefore, additional financial data had to be collected for all years during the 1963 interviewing. After the collection of the monthly data on a departmental and item basis, the financial data were adjusted: 1) to a common fiscal period (calendar years) and 2) to reflect returns arising only from the operations of the business. The rationale and general procedures for making these adjustments are discussed by Baumel (10). Essentially, the reason for adjusting economic data to a common fiscal period is to make the data comparable among firms. The other adjustments were made so that the measures reflected returns from the operations of the business and to make the data comparable among firms.

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*Baumel, C. Phillip, Department of Economics, Iowa State University of Science and Technology, Ames, Iowa, was a member of the research team after 1963. Much of the following discussion outlines his recommendations for collection and analysis of the financial data.

In addition to the adjustments necessary to adjust all financial statements to a common fiscal year period, the following adjustments or computations were made: 1) if not available, balance sheets for December 31, 1959, December 31, 1960, December 31, 1961, December 31, 1963 were computed; 2) accelerated depreciation expenses were subtracted from production expenses so that all firms would have normal depreciation rates; 3) income taxes and interest expenses were subtracted from production expenses so that all firms would be more comparable; 4) patronage refunds, dividends and interest from outside investments were subtracted from income so that income reflected returns arising only from the business operations; 5) outside investments were subtracted from total tangible assets to obtain total tangible operating assets; and 6) the beginning and ending dollar value for each calendar year for various measures of assets were averaged to obtain a better estimate of the actual inputs. The general rationale for these adjustments was presented in the theoretical chapter. The rationale for the specific adjustments mentioned above is discussed by Baumel (10).

After the adjustments were made, the following form was used to compute dollar values for income, expense and profit items for the total business for each calendar year (1960, 1961 and 1962).

1. Total gross commodity sales ________
2. Less total cash discounts ________
3. Total net commodity sales ________
4. Less total cost of goods sold ________
5. Total gross commodity margins ________
6. Plus total net service income ________
7. Total net operating revenue ________
8. Less total production expense ________
9. Total net operating profit ________

The dollar values obtained for the various items on this form will be used in constructing the various economic measures for the total business.

Similar adjustments were made for the financial statement and balance sheet items for the fertilizer and agricultural chemicals departments. In addition, the income and expenses connected with soil insecticides sold in fertilizer was subtracted from the fertilizer department and added to the agricultural chemicals department. In allocating total production expenses to the fertilizer department, three basic procedures were used. First, for expenses such as depreciation, property taxes and insurance, the ratio of fertilizer fixed assets to total fixed assets was used. Second, for expenses such as utilities, travel and conventions, advertising, supplies, truck expenses, repair and maintenance, estimates made by the general managers were used. Third, the ratio of fertilizer net revenue to total net operating revenue was used to obtain payroll expenses connected with the fertilizer department.

After the adjustments were made, the following form was used to compute dollar values for income, expense and profit items for the fertilizer department for each calendar year (1960, 1961 and 1962).

The items from this form used in constructing economic measures for the fertilizer department include: fertilizer net sales, fertilizer net revenue and fertilizer net profits.

1. Fertilizer gross sales __________
2. Less cash discounts __________
3. Fertilizer net sales __________
4. Less cost of goods sold __________
5. Fertilizer gross margins __________
6. Plus net service income __________
7. Fertilizer net revenue __________
8. Less fertilizer production expense __________
9. Fertilizer net profit __________

Agricultural chemical net sales were adjusted to the common fiscal periods (calendar years) by using monthly statements.

The analysis of the financial data will follow the procedures which Winer outlines for a two-factor experiment having repeated measures on one of the factors with a covariate (134, pp. 606-615). Treatment or control will be considered as factor A and years (1961, 1962) as factor B. Repeated measures on factor B, indicate that each experimental unit (business firms) is observed under all levels of factor B, years 1961 and 1962. The covariate is the beginning value for the calendar year of 1960. A program was written from machine computation of this analysis.

Knowledge

The broad category of knowledge in those content areas included in the training program is operationally defined in this research study by several specific measures relating to knowledge about fertilizer, knowledge about agricultural chemicals, knowledge about farmer customers and knowledge about business management. The rationale for including these specific areas was presented in the theoretical orientation chapter. It is assumed that these areas are dimensions of the more general category of knowledge about content areas included in the training program.

Knowledge about fertilizer

Knowledge about fertilizer is measured in this analysis by specific measures relating to: 1) knowledge about fertilizer basic principles and practices and 2) knowledge about educational fertilizer services.

Basic principles and practices   Knowledge about fertilizer basic principles and practices is operationally defined in this research study by a five item scale measuring the respondent's knowledge about commercial fertilizer, its proper application and its effects on plant growth. The items used in this scale were developed by extension agronomists at Iowa State University for a previous research study (28). It was found in that study that the items differentiated dealers as to their knowledge about fertilizer and the dealers' scores were significantly related to certain economic measures for the fertilizer department. The five items were included in both the before interview schedule and the after interview schedule. The items are:

Nitrogen is different than phosphorus and potassium . . .
- a. in that it eventually becomes leachable
- b. because it becomes permanently fixed in the soil and will not leach
- c. because it is organic instead of inorganic
- d. because it is important in bacterial activity

Fertilizer blends are . . .
- a. agronomically inferior to chemically combined fertilizer
- b. less subject to segregation than chemically combined fertilizer
- c. comparable to chemically combined fertilizer if segregation does not occur
- d. higher in cost per ton delivered to the farm

Winter application of fertilizer . . .
- a. is to be avoided at all cost
- b. should be limited to essentially level land
- c. can replace row fertilizer for corn
- d. is subject to leaching losses for phosphorus and potassium

Row fertilizer . . .
- a. is not worth the time and effort necessary to put it on
- b. generally increases early growth of corn and also final yields
- c. is no more effective than the same amount plowed under
- d. returns less per dollar invested than plow-down phosphorus and potassium

The factor that limits the effect of high fertilizer rates for corn in most years under Iowa conditions is . . .
- a. low stand levels
- b. failure to control insects
- c. failure to control weeds
- d. failure to coat corn seed with Aldrin

A score was obtained for each general manager at the beginning and end of the training period. If the general manager selected the correct answer to an item, he was given a score of 1. If he selected a wrong answer, he was given a score of 0. Following this scoring procedure, a total score on the five items was obtained for each general manager. The range of scores was from 2 to 5. Fertilizer principles knowledge scale is used as a measure of the general manager's knowledge about basic principles and practices pertaining to fertilizer and fertilizer use. Knowledge about basic principles and practices pertaining to fertilizer and fertilizer use is assumed to be a dimension of the more general category of knowledge about fertilizer. The distribution of fertilizer knowledge scores, year and category, is presented in Table 10.

Table 10. Distribution of scores on fertilizer principles knowledge scale by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 4	4	50.0	3	60.0	7	53.85
4 and over	4	50.0	2	40.0	6	46.15
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	4	50.0	4	80.0	8	61.54
Increased	4	50.0	1	20.0	5	38.46
Total	8	100.0	5	100.0	13	100.00

The null hypothesis of no difference between treatment and control general managers on beginning scores on fertilizer principles knowledge scale was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 10 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 10. The observed data do not present evidence that beinning scores on fertilizer principles knowledge scale of treatment and control general managers differ significantly.

Educational fertilizer services The measurement of general managers' knowledge about educational fertilizer services in this analysis consists of two separate but related indices: 1) demonstration purpose score and 2) complete fertilizer program score. Each of these is an educational service which could be carried out in connection with the fertilizer department. Both services are directed at improving "proper" use of fertilizer by farmer customers.

Demonstrations A demonstration purpose score was developed by Hougen to measure a general manager's knowledge about the purposes of field demonstrations (54). The fertilizer demonstration purpose score was based on responses made by the general managers to the following question:

> Rank in the order of importance to you the following purposes of a test demonstration that you might set up on some farm in your trade area.
>
> a. To show the outcome of systematic applications of fertilizer, herbicides and insecticides.
> b. To show the interaction effects of fertilizer, herbicides and insecticides.
> c. To show an increase in crop yields from optimum use of fertilizer, herbicides and insecticides.
> d. To show the amount of increase in crop yields that can be attained by using all the fertilizer, herbicides and insecticides that the crop will stand.

The correct ranking of these alternative answers is b or c, a, d. The rationale and development of the scores are found in the original report (54). The scores ranged from 1 to 5. This question was included only in the after interview schedule. Demonstration purpose score is used as a measure of the general manager's knowledge about fertilizer demonstrations. A field test demonstration is a specific example of the use of fertilizer and agricultural chemicals in cropping practices to demonstrate basic principles. It is assumed that the purposes which a general manager ascribes to demonstrations will reflect his knowledge about fertilizer. Thus, knowledge about the purposes of demonstrations is assumed to be a dimension of the more general category of knowledge about fertilizer. The distribution of demonstration purpose scores by category appears in Table 11.

Fertilizer programs To determine the degree of understanding about fertilizer programs for farmer customers, the general managers were asked to respond to the following question in 1963. "In your opinion, what

Table 11. Distribution of demonstration purpose scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 3	4	50.0	4	80.0	8	61.54
3 and over	4	50.0	1	20.0	5	38.46
Total	8	100.0	5	100.0	13	100.00

are the major elements that must be in any complete fertilizer program that a dealer would plan and carry out with his farmer customers? Include items about advice and assistance as well as service." Such a program could be quite extensive, but there are several major elements which were discussed as being important by those making presentations during the training program. Some of the factors discussed were soil tests, past and present land use and cropping programs, alternative uses for the land and capital, managerial ability of the farmer, landlord-tenant relationship, optimum use versus maximum use of fertilizer, and farmer expectations regarding yields and returns. From the business firm viewpoint, services including application services and adequacy of supply of fertilizer would be items that a dealer might include in a fertilizer program. Each general manager was assigned one point for every major item listed with the scores ranging from 2 to 7. The distribution of fertilizer program scores by category appears in Table 12.

The number of major elements mentioned by the general manager is assumed to be an indication of the general manager's knowledge about complete fertilizer programs for his farmer customers.

The fertilizer program score is used as a measure of a general manager's knowledge about complete fertilizer programs for farmer customers. It is assumed that the elements that a general manager would include in complete fertilizer programs for farmer customers reflects his knowledge about fertilizer. Knowledge about complete fertilizer programs for farmers is assumed to be a dimension of the more general category of knowledge about fertilizer.

Table 12. Distribution of fertilizer program scores by category

Category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
After (1963)						
Less than 4	1	12.5	4	80.0	5	38.46
4 and over	7	87.5	1	20.0	8	61.54
Total	8	100.0	5	100.0	13	100.00

Knowledge about agricultural chemicals

Knowledge about agricultural chemicals basic principles and practices is operationally defined in this research study by a fourteen item scale measuring the respondent's knowledge about agricultural chemicals, their proper application and their effects on plant growth. The questions used in this scale were developed by extension specialists from the departments of entomology, botany and plant pathology at Iowa State University. Many of the questions were developed for a previous research study. It was found in that study that the questions differentiated agricultural chemical dealers as to their knowledge about agricultural chemicals and the dealers' scores were significantly related to certain economic indices of the business firm and the chemical department (14). The small sample size prevents the estimation of the reliability of the present construct scale. However, many of the items are exactly the same as the scale developed for the research study with a larger sample. The items used in this study are:

1. Lindane is a better soil insecticide for corn root worms than Aldrin, Chlordane or Heptachlor.
2. The best cure for hog mange and lice is DDT.
3. DDT Granules aren't a very effective control for European corn borers because the borers spend about 3/4 of their time in the stalk during the growing season.
4. The best control of first brood European corn borers can be accomplished by applying the DDT when 75 out of 100 plants in a field show leaf damage.

5. Soil insecticides can be used effectively to control corn root worms by spraying on the ground after the corn is up.

6. 1/2 pound of Aldrin or Heptachlor per acre as a row application will control more soil insects than 1 pound of either chemical per acre as a broadcast treatment.

7. Aldrin and Heptachlor seriously damage soil micro-organisms, seed germination and sometimes plant growth.

8. Chemicals are a substitute for good cultural practices of weed control.

9. 2,4-D is still the best pre-emergence spray for corn.

10. For pasture spraying the __________ form of 2,4-D is preferred.

11. Two of the best soil fumigants are ________ and ________.

12. Weeds cause reduction in crops because of competition for ________, ________, ________.

13. The best material to use as a selective spray in small grain is ________.

14. The best selective spray for weeds along fences, ditch banks and roadsides is ________.

The fourteen items were included in both the before interview schedule and the after interview schedule. A score was obtained for each general manager at the beginning and end of the training period. If the general manager answered the item correctly, he was given a score of 1 for the item. If he answered the item incorrectly, he was given a score of 0 for the item. Following this scoring procedure, a total score on the fourteen items for each general manager was obtained. The range of scores was from 7 to 13. The distribution of chemical knowledge scores by year and category is presented in Table 13.

The number of correct answers to these items is assumed to be an indication of the general manager's knowledge about basic principles and practices pertaining to agricultural chemicals and their use. Knowledge about basic principles and practices pertaining to agricultural chemicals and their use is assumed to be a dimension of the more general category of knowledge about agricultural chemicals. Chemical principles knowledge scale is used as a measure of the level of knowledge about agricultural chemicals.

Table 13. Distribution of scores on chemical principles knowledge scale by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 10	3	37.5	1	20.0	4	30.77
10 and over	5	62.5	4	80.0	9	69.23
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	4	50.0	4	80.0	8	61.54
Increased	4	50.0	1	20.0	5	38.46
Total	8	100.0	5	100.0	13	100.00

The null hypothesis of no difference between treatment and control general managers on beginning scores on chemical principles knowledge scale was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table l does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 13. The observed data do not present evidence that beginning scores on chemical principles knowledge scale treatment and control general managers differ significantly.

Knowledge about farmer customers

Knowledge about farmer customers is operationally defined in this research by four indices: 1) knowledge about farmers' expectations of fertilizer dealer score, 2) knowledge about farmers' expectations of agricultural chemicals dealer score, 3) potential fertilizer use score, and 4) farmers' limiting factors score.

Farmer expectations of fertilizer dealers A multiple choice question was used to obtain a measure of the general manager's understanding of what farmers expect of them as a source of information on fertilizer. The question and the possible responses to it were:

Which one of these statements best describes what the average farmer expects of you as a fertilizer dealer?

a. As a highly qualified source of information on all aspects of fertilizer and fertilizer use.
b. As a qualified source of information on some aspects of fertilizer and fertilizer use.
c. As a fertilizer salesman, but does not use me as a qualified source of information on fertilizer.
d. Only as one of the alternative sources of supply for fertilizer.

The general managers were asked to respond to this question both before and after the training period. Scores were obtained by assigning the responses values ranging from 0 for an answer of "d" to 3 for an answer of "a." The values attached to these responses were based on actual farmer expectations as determined in the trade area and statewide farmer studies (20,128). Because the responses to this question might reflect a change in the general managers' frame of reference between the first and last time they were asked this question, the scores were adjusted by the procedure outlined in the method and procedure section of this chapter. Based on this procedure, the general managers were classified as to whether their scores on this indicator had increased or had not increased.

The distribution for this measure by year and category is reported in Table 14.

Table 14. Distribution of farmers' expectations of fertilizer dealer scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 3	6	75.0	2	40.0	8	61.54
3	2	25.0	3	60.0	5	38.46
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	2	25.0	1	20.0	3	23.08
Increased	6	75.0	4	80.0	10	76.92
Total	8	100.0	5	100.0	13	100.00

Farmers' expectations of fertilizer dealer score is used as a measure of a general manager's understanding of what farmers expect of fertilizer dealers regarding information pertaining to fertilizer and fertilizer use. A general manager's understanding of what farmer customers expect of the fertilizer dealer as a source of information about fertilizer and its use is assumed to be a dimension of the more general category of knowledge about farmer customers.

The null hypothesis of no difference between treatment and control general managers on beginning farmers' expectations of fertilizer dealer scores was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 14 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 14. The observed data do not present evidence that beginning farmers' expectations of fertilizer dealer scores between treatment and control general managers differ significantly.

Farmers' expectations of agricultural chemical dealers. A multiple choice question was used to obtain a measure of the general managers' understanding of what farmers expect of them as a source of information about agricultural chemicals and their use. The general managers were asked to respond to the following question both before and after the training period:

> Which one of these statements best describes what the average farmer expects of you as an agricultural chemical dealer?
>
> a. As a highly qualified source of information on all aspects of agricultural chemicals and their use.
> b. As a source of information on some aspects of agricultural chemicals and their use.
> c. As an agricultural chemical salesman, but does not use me as a qualified source of information on agricultural chemicals.
> d. Only as one of the alternative sources of supply for agricultural chemicals.

Scores were obtained by assigning the responses values ranging from 0 for an answer of "d" to 3 for an answer of "a." The values attached to these responses were based on farmer expectations as determined in the trade area study (20). Because the responses to this question might reflect a change in the general managers' frame of reference between the first and last time they were asked this question, the scores were adjusted by the procedure outlined in the method and procedure section of this chapter. Based on this procedure, the general managers were classified as to whether their scores on this indicator had increased or had not increased. The distribution for this measure appears in Table 15.

Table 15. Distribution of farmers' expectation of agricultural chemicals dealer scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 2	6	75.0	1	20.0	7	53.85
2 and over	2	25.0	4	80.0	6	46.15
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	6	75.0	5	100.0	11	84.62
Increased	2	25.0	0	0.0	2	15.38
Total	8	100.0	5	100.0	13	100.00

Farmers' expectations of agricultural chemicals dealer score is used as a measure of the general manager's understanding of what farmers expect of agricultural chemicals dealers regarding information pertaining to agricultural chemicals and their use. A general manager's understanding of what farmer customers expect of the agricultural chemicals dealer as a source of information about agricultural chemicals and their use is assumed to be a dimension of the more general category of knowledge about farmer customers.

The null hypothesis of no difference between treatment and control general managers on beginning farmers' expectation of agricultural chemicals dealer scores was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 15 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 15. The observed data do not present evidence that beginning farmers' expectations of agricultural chemicals dealer scores for treatment and control general managers differ significantly.

Potential fertilizer use   A multiple choice question asked after the training period was used to obtain a measure of the general manager understanding of present and potential fertilizer use by Iowa farmers. The question and possible responses to it were:

> Based on the average optimum level of fertilizer use for the state, at what level (%) do you think Iowa farmers are presently using fertilizer?
>
> a. 25% optimum
> b. 33% optimum
> c. 50% optimum
> d. 66% optimum
> e. 75% optimum
> f. 100% optimum
> g. 133% optimum
> h. 166% optimum

According to estimates, Iowa farmers are using about one-third of the optimum amount of fertilizer (128). General managers were assigned 1 point for a correct response and received a 0 for an incorrect response. The distribution on potential fertilizer use scores appears in Table 16. Potential fertilizer use score is used as a measure of the manager's understanding of present and potential use of fertilizer by farmers. An understanding of present and potential use is assumed to be a dimension of a more general category of knowledge about farmer customers.

Table 16. Distribution of potential fertilizer use scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Incorrect answer (0)	5	62.5	1	20.0	6	46.15
Correct answer (1)	3	37.5	4	80.0	7	53.85
Total	8	100.0	5	100.0	13	100.00

Limiting factors Two open-end questions were used to obtain a measure of a general manager's understanding of reasons which limit the use of fertilizer by farmers. Both of these questions were asked after the training period. Factors which limit farmers' use of fertilizer can be examined from at least two viewpoints. One viewpoint is, as dealers, what do they perceive as factors limiting farmers' use of fertilizer. The second viewpoint is what do dealers perceive that farmers think are the major limiting factors. This measure is based on responses made by the respondents to the following questions: 1) "From your viewpoint as a retail dealer what are the major factors limiting farmers' use of fertilizer?" and 2) "From what you have heard from farmers, what do you think are the major factors limiting their use of fertilizer?" The scoring for this measure was done by judges.

Lack of knowledge about fertilizer and its use is often mentioned by educators, dealers and others as a limiting factor. The first question was scored as follows: 1) 2 points for mentioning lack of knowledge, understanding or education and 2) 1 additional point for each item which they mentioned that could be called a reasonable or possible answer.

The statewide and trade area studies were used as a basis to determine factors mentioned by farmers. Often mentioned factors by farmers in both studies included purchase cost, risk and uncertainty, lack of necessary application equipment, low return per dollar invested and landlord disagreements. In the trade area study, the present use of manure and "use all I need" were among those factors mentioned by 20 percent or more of the farmers in the study. For scoring the second question, general managers were given credit for answers which they gave in direct proportion to the percent of farmers who, in the trade area study, had said this factor limited their use of fertilizer. The scores on these two questions were combined to obtain a total limiting factor score. The distribution of limiting factors scores by category is recorded in Table 17.

Limiting factors score is used as a measure of the general manager's understanding of the major factors limiting farmers' use of fertilizer. It is an indication of the general manager's understanding of the economic and social circumstances of farmer customers. A general manager's understanding of the major factors limiting farmers' use of fertilizer is assumed to be a dimension of the more general category of knowledge about farmer customers.

Table 17. Distribution of limiting factors scores by category

Category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
After (1963)						
Less than 9	2	25.0	4	80.0	6	46.15
9 and over	6	75.0	1	20.0	7	53.85
Total	8	100.0	5	100.0	13	100.00

Knowledge about business management

Knowledge about business management is operationally defined in this research by three indices: 1) number of management functions identified, 2) margin determination score, and 3) present value of money score. The questions which served as a basis for the development of these measures were included only in the after interview schedule.

Management functions It is assumed that if a general manager is aware of the basic functions of management and can state in general terms what they are he has a better understanding of his managerial role. As stated in the theoretical chapter of this report, the classical basic functions of management are: planning, organizing, directing, coordinating and controlling.

To determine the extent to which general managers could list the classical basic functions of management, they were asked the open-end question: "Persons conducting management training sessions often list certain functions of management. What do you consider to be the major functions of management?" A descriptive statement about the function or naming the function was considered as stating the specific function. The number of functions of management identified by the general managers ranged from 1 to 4. The number of management functions identified by category is reported in Table 18.

The number of functions of management identified is used as a measure of a general manager's understanding of the functions of management. An

Table 18. Distribution of the number of management functions identified by category

Category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
After (1963)						
Less than 3	1	12.5	3	60.0	4	30.77
3 and over	7	87.5	2	40.0	9	69.23
Total	8	100.0	5	100.0	13	100.00

understanding of the functions of management is assumed to be a dimension of the more general category of knowledge about business management.

Margin determination   Under the assumption of profit maximization, it is assumed that the general managers would have some rational means of deciding the margin they take on specific commodity lines and how this margin may be related to sales volume of the specific commodity and related commodities. The determination of margins is an area of responsibility for the general manager. As stated by Phillips, "Formally, the task of the local manager is to set his margin between the retail price and the wholesale price in the way that maximizes net operating proceeds. . . . The margin realized by the business is under control of the manager in his pricing policy" (95, p. 420). "Retail pricing is one of the important responsibilities of operational management in local agricultural businesses" (95, p. 314). The responses to the following question, which listed five alternative situations, were used as a basis for the development of this measure:

> When pricing products and services several factors must be taken into account. Under certain conditions it may be wise to maintain a wide margin even at the sacrifice of sales volume while in other instances it would be better to maintain a smaller margin to get increased sales volume.

In the following examples would you maintain a large or small margin with the possibility of decreasing or increasing volume respectively?

Large margin sacrifice volume	Smaller margin increase volume	
________	________	1. Brand handled recognized by customers as superior to that of competitors.
________	________	2. Extra services wanted by customers cannot be (or are not) provided.
________	________	3. Many other dealers in the trade area have full competitive line.
________	________	4. An aggressive sales and merchandising program is maintained.
________	________	5. Increased sales of this line have little value for increasing sales of other lines handled.

The scoring of this question is based on discussions by Phillips (95). The correct answer for each situation is based upon the competitive situation and the elasticity of demand. A general manager was given one point for each correct answer. The range of scores was from 2 to 5. The distribution of margin determination scores by category is recorded in Table 19.

Margin determination score is used as a measure of a general manager's understanding of retail pricing including setting of margins and the competitive or complementary interrelationships among inputs and among outputs. It is assumed that understanding of retail pricing is a dimension of knowledge about basic economic principles and techniques. Knowledge of basic economic principles and techniques is assumed to be a dimension of the more general category of knowledge about business management.

Present value of money Under dynamic considerations of the business firm, future net returns and future net costs may be discounted by some reasonable interest rate to make them comparable with current returns and current costs. In long range planning, an understanding of this concept

Table 19. Distribution of margin determination scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 4	4	50.0	2	40.0	6	46.15
4 and over	4	50.0	3	60.0	7	53.85
Total	8	100.0	5	100.0	13	100.00

assists the general manager in choosing between alternatives for the business operations. To obtain a measure of the manager's understanding of this concept, the following hypothetical problem was posed to each manager:

> We are interested in your reaction to the following hypothetical problem. You are advising a farmer who has 360 acres of crop land. 300 acres are top quality land. 60 acres is land that will raise corn but not as well as the rest of the farm. It would be possible to raise trees on this land that would produce in 10 years.
>
> Which of the following alternatives would you recommend to this farmer?
>
> _____a. Raise corn on this 60 acres of land and receive a net profit of $900 per year for 10 years.
>
> _____b. Raise trees on this 60 acres of land and receive $10,000 net profit at the end of 10 years.
>
> What factors did you take into consideration in making this decision?

Present value of money refers to the difference in the value of a given amount of money at the present time compared to its value over time. Assuming that money could bring a reasonable return (anything over two percent) alternative "a" would be the correct answer. For scoring purposes, general managers were given 0 points for the wrong alternative, 1 point for the correct answer but using poor logic, and 2 points for the right alternative and good logic. The scores ranged from 0 to 3. The distribution of present value of money scores by category appears in Table 20.

Table 20. Distribution of present value of money scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 2	3	37.5	5	100.0	8	61.54
2 and over	5	62.5	0	00.0	5	38.46
Total	8	100.0	5	100.0	13	100.00

The present value of money score is used as a measure of the level of knowledge about basic economic principles and techniques. Knowledge of basic economic principles and techniques is assumed to be a dimension of the more general category of knowledge about business management.

Attitudes

The broad category of attitudes toward content areas included in the training program is operationally defined in this research by several specific measures relating to attitudes toward: 1) fertilizer department, 2) perceived importance of agricultural chemicals department, 3) role with fertilizer customers, 4) role with agricultural chemicals customers, 5) qualifications as an information source on fertilizer and agricultural chemicals, and 6) orientation toward management of the business. The rationale for including these specific areas from the training program was presented in the theoretical chapter of this report. It is assumed that these areas are dimensions of the more general category of attitudes toward content areas included in the training program.

In the theoretical section, three supporting hypotheses were stated under the general hypotheses about attitude changes. The areas for which supporting hypotheses were stated include: attitudes toward fertilizer, attitudes toward agricultural chemicals and attitudes toward operational management. Attitudes toward their role with farmer customers and orientation toward management of the business operations are assumed to be dimensions of attitudes toward operational management. As discussed in the theoretical section, the farmer customers need and seek advice about farming practices in the process of purchasing farm supplies. Thus, "attitudes toward operational management" for purposes of operationalizing to empirical hypotheses, has been divided into 1) role with fertilizer customers, 2) role with agricultural chemicals customers, 3) qualifications as a source of information about fertilizer and agricultural chemicals, and 4) orientation toward management of the business. These areas are assumed to be dimensions of the more general category of attitudes toward operational management.

Attitudes toward fertilizer department

Attitudes toward fertilizer are measured in this research by three separate, but related indices: 1) perceived importance of fertilizer department index, 2) general attitudes toward fertilizer index, and 3) perceived importance of planning fertilizer programs for farmers to business success index. It is assumed that areas for which these indices will be used as measures are dimensions of the more general category of attitudes toward fertilizer.

Importance of fertilizer department   If general managers feel that the fertilizer department is important to their business operation from a monetary standpoint, it logically follows that this would be an important element of a favorable attitude toward the fertilizer department in their businesses. This assumption is based on the assumed goal of profit maximization for the business firm. The perceived importance of the fertilizer department index is used as a measure of the extent to which the general manager places a monetary value on the fertilizer department. This index was derived from a multiple choice question which was included in both the before and after interview schedules. The question and the possible responses to it were:

> Please indicate your evaluation of the importance of fertilizer to your total business from this list of statements.
>
> a. A good money maker in itself.
> b. An important service to bring in business.
> c. Just another customer service.
> d. Not a money maker, but have to carry fertilizer to compete with other businesses.

Scores were obtained by assigning the responses values ranging from 0 for an answer of "d" to 3 for an answer of "a." The distribution for this measure by year and category is recorded in Table 21.

It is assumed that perceived importance of the fertilizer department is a dimension of the more general category of attitudes toward fertilizer.

The null hypothesis of no difference between treatment and control general managers on beginning scores on perceived importance of fertilizer department index was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 21 does not fall in the critical region of the probability distribution given fixed marginal frequencies recorded in Table 21. The observed data do not present evidence that the beginning scores on perceived importance of fertilizer department index for treatment and control general managers differ significantly.

Table 21. Distribution of scores for perceived importance of fertilizer department by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 3	4	50.0	2	40.0	6	46.15
3	4	50.0	3	60.0	7	53.85
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	4	50.0	5	100.0	9	69.23
Increased	4	50.0	0	0.0	4	30.77
Total	8	100.0	5	100.0	13	100.00

General attitudes Hougen developed a general attitude toward fertilizer index to measure the favorableness of attitudes toward fertilizer (54). The rationale and development of the scores are found in the original report (54). The responses to four partial statements about fertilizer were used as a basis for the development of this measure. Responses to the statements were scored according to the extent a "favorable" attitude toward fertilizer was expressed by a general manager in his response. The sentence completion items which were asked of the general managers before and after training were:

a. In my business the thing I dislike most about selling
   fertilizer is ___________
b. The margin of profit on fertilizer is _________
c. The fertilizer business is _________
d. The biggest problem in the fertilizer business is _________

The scores from these four statements were added together to get one total score. The range of scores was from 3 to 12 with the possible range being 0 to 13. The distribution of general attitudes toward fertilizer scores by year and category is presented in Table 22. General attitudes toward fertilizer index is used as a measure of the general manager's favorableness of attitudes toward fertilizer. Favorableness of attitudes toward fertilizer is assumed to be a dimension of the more general category of attitudes toward fertilizer.

The null hypothesis of no difference between treatment and control general managers on beginning scores on general attitudes toward fertilizer index was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 22 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 22. The observed data do not present evidence that beginning scores on general attitudes toward fertilizer index for treatment and control general managers differ significantly.

Table 22. Distribution of scores on general attitudes toward fertilizer index by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 8	3	37.5	3	60.0	6	46.15
8 and over	5	62.5	2	40.0	7	53.85
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	4	50.0	3	60.0	7	53.85
Increased	4	50.0	2	40.0	6	46.15
Total	8	100.0	5	100.0	13	100.00

Importance of fertilizer program One of the services which general managers could offer in connection with their fertilizer department is that of planning fertilizer programs for farmers. General managers were questioned as to their perception of the importance to the success of their businesses that the farmer receive assistance from them in planning a fertilizer program for his farm. The possible responses were: very important, quite important, not very important and of no importance. Scores were obtained by assigning the responses values ranging from 3 to 0 respectively. The distribution of scores for perceived importance of planning fertilizer programs for farmers to business success appears in Table 23.

The perceived importance of planning farmer fertilizer programs to business success index is used as a measure of the importance to business success which a general manager places on planning farmer fertilizer programs. It is assumed that perceived importance of planning fertilizer programs for farmers to business success is a dimension of the more general category of attitudes toward fertilizer. The item from which this index was derived was included only on the after interview schedule.

Table 23. Distribution of scores for perceived importance of planning farmer fertilizer programs by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 3	3	37.5	2	40.0	5	38.46
3	5	62.5	3	60.0	8	61.54
Total	8	100.0	5	100.0	13	100.00

Importance of agricultural chemicals

As in the case of fertilizer, if general managers feel that the agricultural chemicals department is important to their business operation from a monetary standpoint, it logically follows that this would be an important element of a favorable attitude toward the agricultural chemicals department in their businesses. This assumption is based on the assumed goal of profit maximization for the business firm. The perceived importance of the agricultural chemicals department index is used as a measure of the extent to which the general manager places a monetary value on the agricultural chemicals department. This index was derived from a multiple choice question which was included in both the before and after interview schedules. The item and the possible responses to it were:

> Please indicate your evaluation of the importance of agricultural chemicals to your total business from this list of statements.
>
> a. A good money maker in itself.
> b. An important service to bring in business.
> c. Just another customer service.
> d. Not a money maker, but have to carry agricultural chemicals to compete with other businesses.

Scores were obtained by assigning the responses values ranging from 0 for an answer of "d" to 3 for an answer of "a." The distribution of scores for this measure by years and category is recorded in Table 24.

Table 24. Distribution of scores on perceived importance of agricultural chemicals department index by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 3	5	62.5	3	60.0	8	61.54
3	3	37.5	2	40.0	5	38.46
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	5	62.5	5	100.0	10	76.92
Increased	3	37.5	0	0.0	3	23.08
Total	8	100.0	5	100.0	13	100.00

The null hypothesis of no difference between treatment and control general managers on beginning scores on perceived importance of agricultural chemicals department index was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 24 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 24. The observed data do not present evidence that beginning scores on perceived importance of agricultural chemicals department index for treatment and control general managers differ significantly.

Role with fertilizer customers

Attitudes toward their role with their fertilizer customers are measured in this research by 1) opinion leader (fertilizer) index, 2) fertilizer dealer responsibility index, 3) technical fertilizer information index, and 4) perceived importance of planning farmer fertilizer programs index. It is assumed that the areas for which these indices will be used as measures are dimensions of the more general category of attitudes toward their role with their fertilizer customers.

Opinion leadership   The opinion leader index was designed by Campbell (28) to measure the extent to which the individual dealer believes he should attempt to influence the customer's decisions on the amount and analysis of fertilizer to apply and how to apply it. As stated by Campbell, "The extent to which the individual believes he should attempt to influence customer's decisions with respect to the use of fertilizer is an index of opinion leadership" (28, p. 51). The items for this index are:

> Do you think you should try to influence the farmer's decision about which analyses of fertilizer to use?
>
> Do you think you should try to influence the farmer's decision about how much fertilizer to apply?
>
> Do you think you should try to influence the farmer's decision about how to apply the fertilizer?

The possible responses and assigned values are: Most certainly should - 6 points, certainly should - 4 points, probably should - 3 points, probably should not - 2 points, and should not - 0 points. The total scores for the general managers ranged from 8 to 18. The distribution of scores on opinion leadership (fertilizer) index by year and category is recorded in Table 25. These items are included in both the before and after benchmark schedules.

Table 25. Distribution of scores on opinion leadership (fertilizer) index by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 10	1	12.5	1	20.0	2	15.38
10 to 14	3	37.5	4	80.0	7	53.85
More than 14	4	50.0	0	0.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Less than 10	1	12.5	1	20.0	2	15.38
10 to 14	4	50.0	2	40.0	6	46.15
More than 14	3	37.5	2	40.0	5	38.46
Total	8	100.0	5	100.0	13	99.99
Means						
1961	14.38		11.80		13.38	
1963	13.50		13.20		13.38	

Opinion leadership (fertilizer) index is used as a measure of the extent to which the general manager believes that he should attempt to influence farmer customer's decisions with respect to fertilizer use.

The null hypothesis of no difference between treatment and control general managers on beginning scores on opinion leadership (fertilizer) index was tested. The calculated F value was 1.99 which is not significant at the .05 probability level. Because the calculated F does not exceed the tabular F, it is concluded that the observed data do not provide evidence of a significant difference on beginning scores on opinion leadership (fertilizer) index between treatment and control general managers.

Responsibility for recommendations The fertilizer dealer responsibility index is used as a measure of the extent to which an individual believes that a fertilizer dealer has responsibility in making recommendations to fertilizer customers. This index was derived from a multiple choice item included only on the after interview schedule. The item and the possible responses to it were:

Which of the following statements best describes the way you feel about handling fertilizer in your business?

a. The dealer has a responsibility to keep himself well enough informed to make recommendations on all product lines he handles, including fertilizer.
b. The dealer has a responsibility to pass on only that information about fertilizer which is requested by the customer.
c. The dealer should be extremely cautious in making recommendations about fertilizer as a poor recommendation could result in a loss of customers who are buying his major product lines.
d. In so far as fertilizer are concerned the smart dealer should provide the fertilizer requested by his customers but should make no recommendations about their use.

The responses were assigned values of 3 to 0 from "a" to "d" respectively. The range in scores was from 0 to 3. The distribution of scores by category is presented in Table 26.

Table 26. Distribution of scores on fertilizer dealer responsibility index by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 3	0	0.0	1	20.0	1	7.69
3	8	100.0	4	80.0	12	92.31
Total	8	100.0	5	100.0	13	100.00

Providing technical information A related measure to the preceding one is the general manager's feelings about providing technical information to farmers on fertilizer use. General managers were asked in 1963 how they felt about providing technical information to farmers on fertilizer use. The responses to this item included most certainly should, certainly should, probably should, probably should not, or should not; these answers were scored 4, 3, 2, 1, and 0 respectively. The distribution of scores by category appears

Table 27. Distribution of scores on technical fertilizer information index information by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 4	3	37.5	1	20.0	4	30.77
4	5	62.5	4	80.0	9	69.23
Total	8	100.0	5	100.0	13	100.00

in Table 27. The fertilizer technical information index is used as a measure of the extent to which a general manager believes that a fertilizer dealer should provide technical information to farmer customers.

Importance of fertilizer programs In 1963, general managers were asked to respond to a question which was related to their attitudes toward fertilizer programs for their fertilizer customers. The question was: "How important to the farmer is it that he receives assistance in planning a fertilizer program for him?" They responded by choosing one of the following: very important, quite important, not very important, and of no importance. Scores were assigned these possible answers ranging from 0 for "of no importance" to 3 for "very important." The distribution of scores by category is recorded in Table 28. The perceived importance of planning farmer

Table 28. Distribution of scores on perceived importance of planning farmer fertilizer programs index by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 3	3	37.5	1	20.0	4	30.77
3	5	62.5	4	80.0	9	69.23
Total	8	100.0	5	100.0	13	100.00

fertilizer programs index is used as a measure of a favorable attitude toward the role with fertilizer customers.

Role with chemical customers

Attitudes toward their role with their agricultural chemicals customers are measured in this research by 1) opinion leader (agricultural chemicals) index, 2) agricultural chemicals dealer responsibility index, and 3) agricultural chemicals technical information index. It is assumed that the areas for which these indices will be used as measures are dimensions of the more general category of attitudes toward their role with their agricultural chemical customers. These indexes are similar to the ones for fertilizer. The scoring was the same. Therefore just the items and range of scores will be presented.

Opinion leadership The opinion leadership (agricultural chemicals) index is used as a measure of the extent to which a general manager believes that he should influence the customer's decisions on the categories of agricultural chemicals to use, extensiveness of their use and method of application. The items for this index are:

> Do you think you should recommend to farmers that they use more categories of agricultural chemicals?
>
> Do you think you should recommend to farmers that they use chemicals more extensively in their farm operations? For instance, use chemicals on more acres.
>
> Do you think you should make recommendations to farmers concerning the method of application?

The scores ranged from 8 to 18. The distribution of scores by year and category is presented in Table 29. These items were included in the interview schedules administered before and after the training period.

The null hypothesis of no difference between treatment and control general managers on beginning scores on opinion leadership (agricultural chemicals index was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of a significant difference on beginning scores on opinion leadership (agricultural chemicals) index between treatment and control general managers. The means for 1961

Table 29. Distribution of scores on opinion leadership (agricultural chemicals) index by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1963)						
Less than 10	1	12.5	0	0.0	1	7.69
10 to 14	5	62.5	3	60.0	8	61.54
More than 14	2	25.0	2	40.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Less than 10	2	25.0	0	0.0	2	15.38
10 to 14	5	62.5	2	40.0	7	53.85
More than 14	1	12.5	3	60.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
Means						
1961	12.88		12.80		12.85	
1963	11.88		14.60		12.92	

for treatment and control are practically identical. With means this close, it probably would not have been necessary to carry out a statistical test.

Responsibility for recommendations The agricultural chemicals dealer responsibility index is used as a measure of the extent to which the general manager believes that an agricultural chemical dealer has responsibility in making recommendations to agricultural chemical customers. This index was derived from a multiple choice item which was included in the after interview schedule. The item and the possible responses to it were:

> Which of the following statements best describes the way you feel about handling agricultural chemicals in your business?
>
> a. The dealer has a responsibility to keep himself well enough informed to make recommendations on all product lines he handles, including agricultural chemicals.
> b. The dealer has a responsibility to pass on only that information about agricultural chemicals which is requested by the customer.
> c. The dealer should be extremely cautious in making recommendations about agricultural chemicals as a poor recommendation could result in a loss of customers who are buying his major product lines.

d. In so far as agricultural chemicals are concerned, the smart dealer should provide the agricultural chemicals requested by his customers but should make no recommendations about their use.

The distribution of scores by category is reported in Table 30.

Table 30. Distribution of scores on dealer responsibility (chemicals) index by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 3	3	37.5	1	20.0	4	30.77
3	5	62.5	4	80.0	9	69.23
Total	8	100.0	5	100.0	13	100.00

Providing technical information The agricultural chemicals technical information index is used as a measure of the extent to which a general manager believes that a chemical dealer should provide technical information about agricultural chemicals to agricultural chemical customers. The question and possible responses were the same as for fertilizer except the words agricultural chemicals were inserted for fertilizer. The distribution of scores by category is presented in Table 31.

Qualifications

General managers' perceptions of how qualified they feel to provide information on their product lines and their perception of the adequacy of the information which they provide are used as areas for which measures are developed to obtain an indication of their attitudes toward qualifications as sources of information. It is assumed in responding to questions in these areas the kinds of information needed by the farmer customers were considered by the general managers. These areas are assumed to be dimensions of the more general category of knowledge about farmer customers.

Table 31. Distribution of scores on agricultural chemicals technical information index by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 4	3	37.5	2	40.0	5	38.46
4	5	62.5	3	60.0	8	61.54
Total	8	100.0	5	100.0	13	100.00

Providing fertilizer information During both the before and after interviewing, general managers were asked: "Do you feel that you have enough information in order to provide farmers with technical information about fertilizer and fertilizer use?" The four possible answers to each question ranged from "completely adequate" to "very inadequate." For measurement purposes, these answers were scored from 3 to 0 respectively. Because the responses to this question might reflect a change in the general managers' frame of reference between the first and last times they were asked this question, the scores were adjusted by the procedure outlined in the method and procedure section of this chapter. Fertilizer information qualification index was derived from the above question. This index is used as a measure of the general manager's perception of his adequacy of information in order to provide farmers with technical information about fertilizer and fertilizer use. The distribution of scores by year and category appears in Table 32.

The null hypothesis of no difference between treatment and control general managers on beginning scores on fertilizer information qualification index was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 32 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 32. The observed data do not present evidence that beginning scores on information qualification index for treatment and control general managers differ significantly.

Table 32. Distribution of scores on fertilizer information qualification index by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 2	5	62.5	1	20.0	6	46.15
2 and over	3	37.5	4	80.0	7	53.85
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	0	0.0	3	60.0	3	23.08
Increased	8	100.0	2	40.0	10	76.92
Total	8	100.0	5	100.0	13	100.00

Providing agricultural chemical information The general managers were asked the same type question about the adequacy of agricultural chemical information as the one mentioned above for fertilizer. The question was included in both the before and after interview schedule. The scoring was the same for this question as for the one above. Chemical information qualification index is used as a measure of the general manager's perception of his adequacy of information to be used in providing farmers with technical information about agricultural chemicals and their use. The distribution of scores by year and category is reported in Table 33.

The null hypothesis of no difference between treatment and control general managers on beginning scores on chemical information qualification index was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 33 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 33. The observed data do not present evidence that beginning scores on chemical information qualification index for treatment and control general managers differ significantly.

As well qualified as on other product lines The adequacy of information can be approached from another viewpoint. Do general managers feel as well qualified to provide information on fertilizer or agricultural chemicals

Table 33. Distribution of scores on chemical information qualification index by year and category

Year and category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
Before (1961)						
Less than 2	4	50.0	2	40.0	6	46.15
2 and over	4	50.0	3	60.0	7	53.85
Total	8	100.0	5	100.0	13	100.00
Final (1963)						
Did not increase	3	37.5	4	80.0	7	53.85
Increased	5	62.5	1	20.0	6	46.15
Total	8	100.0	5	100.0	13	100.00

as other product lines? The general managers were asked: "Do you feel as well qualified to provide information (other than price) on fertilizer as on your other product lines?" and "Do you feel as well qualified to provide information (other than price) on agricultural chemicals as on your other product lines?" The general managers responded to these questions by answering "yes" or "no." These questions were asked only in 1963. However, supplemental questions were asked to determine if the general manager had increased or had not increased their qualifications from 1961. Each question was used to develop an index. The perceived qualification to provide fertilizer information as compared to other product lines index is used as a measure of the extent to which the general manager perceives his information about fertilizer is as adequate as that of other product lines. The distribution for this measure by category is recorded in Table 34. The perceived qualifications to provide chemical information as compared to other product lines is used as a measure of the extent to which the general manager perceives his information about agricultural chemicals is as adequate as that of other product lines. The distribution for this measure by category is reported in Table 35.

Table 34. Distribution for perceived qualifications to provide fertilizer information by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Did not increase	1	12.5	1	20.0	2	15.38
Increased	7	87.5	4	80.0	11	84.62
Total	8	100.0	5	100.0	13	100.00

Table 35. Distribution for perceived qualifications to provide agricultural chemical information by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Did not increase	4	50.0	2	40.0	6	46.15
Increased	4	50.0	3	60.0	7	53.85
Total	8	100.0	5	100.0	13	100.00

Management

Orientations toward management of the business are measured in this research by 1) the progressivism scale and 2) orientation to economic principles index. It is assumed that areas for which these measures will be used are dimensions of the more general category of orientations toward management of the business.

Merchandising A measure of dealers' predispositions toward the adoption of new merchandising techniques and practices was developed in a former research study. As stated by Campbell, "The dealer progressivism scale is an index of orientation toward change" (28, p. 44). The items for this scale are listed below:

1. In order to stay in business a dealer has to keep learning and trying new things.
2. Most dealers spend too much time and effort in keeping themselves up to date on new merchandising practices.
3. Many of the new merchandising ideas that come out these days are not practical for the average dealer.
4. It is more important for the dealer to make decisions on the basis of past personal experience than to try to find out new ways to do things.
5. So many products are coming out these days that it is impossible for the dealer to keep himself informed with respect to the lines he handles.
6. The continuous changes taking place in business practices make it difficult for me.

The measure was obtained both before and after the training period. The general managers were asked to respond to each statement by choosing one of the following answers: strongly agree, agree, disagree, or strongly disagree. A score was calculated from these responses by weighting them from 0 to 3 with 3 indicating the most progressivism on the item. The distribution of scores on the progressivism scale by year and category is recorded in Table 36. The progressivism scale is used as a measure of the general manager's predispositions toward the adoption of new merchandising techniques and practices.

Table 36. Distribution of scores on progressivism scale by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 11	3	37.5	3	60.0	6	46.15
11 and over	5	62.5	2	40.0	7	53.85
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	4	50.0	3	60.0	7	53.85
Increased	4	50.0	2	40.0	6	46.15
Total	8	100.0	5	100.0	13	100.00

The null hypothesis of no difference between treatment and control general managers on beginning scores on the progressivism scale was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 36 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 36. The observed data do not present evidence that the beginning scores on the progressivism scale for treatment and control general managers differ significantly.

Economic principles In 1963, general managers were asked to respond to a statement related to their attitudes toward economic principles. The statement was: "Most dealers spend too much time and effort in learning basic economic principles and techniques compared to other parts of their business." They responded by choosing one of the following: strongly agree, agree on the whole, disagree on the whole, or strongly disagree. Scores were assigned these possible answers ranging from 0 for "strongly agree" to 3 for "strongly disagree." The distribution of scores by category is presented in Table 37. Orientation to economic principles index is used as a measure of a general manager's attitude toward management.

Table 37. Distribution of scores on orientation to economic principles index by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 2	1	12.5	4	80.0	5	38.46
2 and over	7	87.5	1	20.0	8	61.54
Total	8	100.0	5	100.0	13	100.00

Operational Management

The broad category of performance in operational management of the business is operationally defined in this research by several specific measures relating to 1) managerial planning and decision making, 2) employee management, 3) procurement management, 4) agricultural chemicals inventory management for operational purposes, 5) retail credit management and 6) sales management. Sales management or retail selling and purchasing will be divided into four major areas. As stated by Phillips, "The management of retail selling and buying in local businesses includes the planning, organizing, directing, coordinating and controlling of four closely allied areas. These are 1) retail pricing, 2) direct selling and purchasing efforts, 3) retail advertising, and 4) supplemental methods of volume promotion" (95, p. 418). Both customer relations and retail selling and purchasing are placed under operational management by Phillips. The distinction made by Phillips between the two areas is: "The objective of sales programs is to make farmers trade with the business in volume. The objective of customer relations programs is to make farmers in the trade territory like the business. The two types of programs are complementary, not substitutes" (95, p. 417). Although some of the operational measures could be placed under customer relations, all of the measures in this study will be placed under sales management because this theoretical distinction was not explicitly made in the questions for the interview schedules. For instance, in the area of advertising the questions were about advertising in general. At a more specific level, measures are developed relating to 1) planning and decision making, 2) employee management, 3) fertilizer procurement management, 4) agricultural chemicals inventory management, 5) retail credit programs for customers, and 6) sales management in regard to fertilizer department. It is assumed that these areas are dimensions of the more general category of performance in operational management.

Planning and decision making

Planning has been defined as, " . . . the thoughtful determination and systematic arrangement of all the factors required to achieve the goals and objectives of the business" (1, p. 13). Phillips divides managerial planning into four steps: "looking ahead," "making decisions," "planning implementation," and "planning evaluation" (95, pp. 59-69). Planning is operationally defined in this research by the following indices: 1) fertilizer trend score, 2) decision-making score, 3) implementation score, 4) evaluation score, 5) planned approach to customer score, 6) advertising planning score, and 7) advertising decision-making score. It is assumed that the areas for which these indices will be used as measures are dimensions of the more general category of managerial planning and decision making.

Fertilizer trends Phillips states, "The first essential of good managerial planning is that of constantly looking ahead, studying current trends and developments and interpreting their probable consequences on the business" (95, p. 60). Long range planning usually refers to a period of time which is sufficiently long that both current and fixed assets can be altered. The general managers were asked, in 1963 interviewing, a series of questions related to the projection of fertilizer sales in their trade area. This set of questions was:

1. Have you given any consideration to probable future fertilizer sales trends in your trade area? _______Yes _______No
2. Which of the following statements best describes the methods you used?

    __________ 1) Made projections on the basis of personal judgement based on day-to-day knowledge of business potential.

    __________ 2) Worked out potential sales on paper or mentally by making only limited use of available sales records in my business.

    __________ 3) Worked out mentally the potential fertilizer sales using business records and other available data.

    __________ 4) Worked out on paper the potential fertilizer sales using business records and other available data.

3. What factors and data did you consider in deciding this sales potential?

The available responses to question 2 were scored by assigning a value of 4 to alternative "d," 3 to alternative "c," 2 to alternative "b," and 1 to alternative "a." If general managers indicated that they had not considered probable future fertilizer sales trends, they were given 0 points. Scores were adjusted 1 point either way if their answer to question 3 indicated that a different alternative should have been checked in question 2 than the one indicated by the general manager. Question 3 was included to assist in eliminating differences in the general managers' perceptions of the short descriptive statements in question 2. Fertilizer trend score is used as a measure of the extent to which general managers have analyzed future fertilizer sales in their trade areas. Analyzing future sales is assumed to be a dimension of the more general category of managerial planning and decision making. The distribution of fertilizer trend scores by category appears in Table 38.

Table 38. Distribution of fertilizer trend scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 2	2	25.0	2	40.0	4	30.77
2 and over	6	75.0	3	60.0	9	69.23
Total	8	100.0	5	100.0	13	100.00

Decision making One of the responsibilities of the general manager is to make major decisions relating to the operational management of the local retail farm supply business. The process which a general manager follows in making a decision will have an effect on the soundness of the decision and will effect the results of the decision. Phillips lists six distinct steps in the decision-making process: "1. Stating the problem or opportunity; 2. Listing the workable alternatives; 3. Determining the information needed to appraise the alternatives; 4. Assembling and organizing the needed information; 5. Evaluating the alternatives on the basis of the information obtained; 6. Formulating the conclusion in terms of action" (95, pp. 62-63).

In 1963, the general managers were asked two questions related to decision making. These questions were:

1. In making a major decision what steps or processes do you go through?

2. In making a major decision, which of the following statements best describes the methods you use in evaluating alternatives?

    a. Rely solely on managerial judgement in making most decisions.

    b. Work out potential profits (expected sales and expenses) but do not have detailed records which can be used as a base.

    c. Work out potential profits (expected sales and expenses) from records mentally.

    d. Work out potential profits (expected sales and expenses) from records on paper.

The responses to question 1 were scored in terms of the number of decision-making steps identified by the general manager in his response. The general managers were given one point for each of the steps which they could name or describe in their own words. The scores ranged from 0 to 3. For the second question, the possible choices of responses are increasingly thorough in going from alternative "a" to alternative "d." For scoring purposes, values of 1 to 4 were assigned to methods "a" to "d" respectively.

Since sound systematic decision making consists of a logical sequence of stages and includes evaluation of alternatives, the scores to both of the above questions were added together to obtain a decision-making score. Decision-making score is used as a measure of the extent to which a general manager uses a logical and systematic method in approaching major decision-making situations. A logical and systematic method of approaching major decisions is assumed to be a dimension of the more general category of planning and decision making. The distribution of decision-making scores by category is recorded in Table 39.

Implementation   As stated by Phillips, "After the decision has been made the next step in the process of managerial planning is to formulate the blueprint for implementing the decision" (95, p. 68). The general managers

Table 39. Distribution of decision-making scores by category

Category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
After (1963)						
Less than 6	4	50.0	3	60.0	7	53.85
6 and over	4	50.0	2	40.0	6	46.15
Total	8	100.0	5	100.0	13	100.00

were asked the following question during the 1963 interviewing: "What are some of the things you would do to insure that a planned change will be successful?" Based on a general manager's response to this question, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used would lead to successful implementation of decisions. The method of scoring was outlined in the method and procedure section of this chapter. Implementation score is used as a measure of the extent to which a general manager uses procedures which should lead to successful implementation of decisions. The coded scores ranged from -0.842 to +0.540. A frequency distribution of the coded implementation scores by category appears in Table 40. Implementation of decisions is assumed to be a dimension of the more general category of managerial planning and decision making.

Evaluation As stated by Phillips, "On any major change in program resulting from a new decision, management should work out in advance the methods to be used to evaluate the total effect of the change of business operations" (95, p. 69). To obtain a measure of this dimension of managerial planning, the following question was included on the 1963 interview schedule: "How will you determine whether a planned change is successful?" The interviewer was instructed to probe to see if plans were made in advance for the evaluation of decisions. Based on a general manager's response to this question, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used would

Table 40. Distribution of coded implementation scores by category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Coded score						
-2.326 to -.500	1	12.5	0	0.0	1	7.69
-.500 to +.500	6	75.0	5	100.0	11	84.62
+.500 to +2.326	1	12.5	0	0.0	1	7.69
Total	8	100.0	5	100.0	13	100.00
Mean	0.043		-0.090		-0.008	

lead to successful evaluation of decisions. The method of scoring outlined in the methods and procedure section was used in scoring this question. Evaluation score is used as a measure of the extent to which a general manager uses procedures which should lead to successful evaluating of decisions. The coded scores ranged from -0.540 to +0.842. A frequency distribution of the coded evaluation scores by category appears in Table 41. Evaluation of decisions is assumed to be a dimension of the more general category of managerial planning and decision making,

Table 41. Distribution of coded evaluation scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Coded score						
-2.326 to -.500	0	0.0	1	20.0	1	7.69
-.500 to +.500	6	75.0	3	60.0	9	69.23
+.500 to +2.326	2	25.0	1	20.0	3	23.08
Total	8	100.0	5	100.0	13	100.00
Mean	0.275		-0.001		0.169	

Approach to customers   As mentioned earlier, the major functions of management are performed at various levels and may be performed with respect to various activities. To obtain a measure of planning in retail selling, the general managers were asked: "Selling is a matter of getting your ideas and product information to your customers. What factors do you take into consideration when you are planning your approach to your customers?"

For measurement purposes, the general managers were given one point for each factor they mentioned which indicated that they were considering a concept in the communication model. Examples of answers considered correct would be availability of products and facilities (sender), what to say to different types of customers (message), whether to use advertising, promotion techniques, direct contact, etc. (media), and managerial ability, economic, personal and social characteristics of the customer (receiver).

Table 42. Distribution of planned approach to customer scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 4	3	37.5	2	40.0	5	38.46
4 and over	5	62.5	3	60.0	8	61.54
Total	8	100.0	5	100.0	13	100.00

The range in scores was from 2 to 6. The question was only included in the after interview schedule. Planned approach to customer score is used as a measure of the extent to which a general manager considers relevant factors in planning his approach to customers. The distribution of planned approach to customer scores by category is presented in Table 42. Planning approaches to customers is assumed to be a dimension of the more general category of managerial planning and decision making.

Advertising planning program To obtain a measure of planning for advertising program, the general managers were asked the following question: "Do you plan and evaluate your advertising program? _____ Yes _____ No Explain." Based on a general manager's response to this question, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used would lead to successful planning of advertising programs. The method of scoring this question was outlined in the method and procedure section of this chapter. The coded scores ranged from -2.326 to +0.343. Advertising planning score is used as a measure of the extent to which a general manager uses procedures which should lead to successful planning of advertising programs. A frequency distribution of coded advertising planning scores by category appears in Table 43. This item was included only on the final interview schedule. Planning advertising programs is assumed to be a dimension of the more general category of managerial planning and decision making.

Table 43. Distribution of coded advertising planning scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Coded score						
-2.326 to -.500	5	62.5	5	100.0	10	76.92
-.500 to +.500	3	37.5	0	0.0	3	23.08
+.500 to +2.326	0	0.0	0	0.0	0	0.00
Total	8	100.0	5	100.0	13	100.00
Mean	-1.216		-1.444		-1.304	

Advertising decision making To obtain a measure of decision making regarding the allocation of funds for advertising, the general managers were asked the following question during the 1963 interviewing: "How do you decide how much money to spend on advertising?" Based on a general manager's response to this question, judges were asked to indicate on a scale of 1 to 99 how

Table 44. Distribution of coded allocation of advertising funds scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Coded score						
-2.326 to -.500	7	87.5	5	100.0	12	92.31
-.500 to +.500	1	12.5	0	0.0	1	7.69
+.500 to +2.326	0	0.0	0	0.0	0	0.00
Total	8	100.0	5	100.0	13	100.00
Mean	-0.828		-1.142		-0.949	

certain they were that the procedures described by the manager would lead to successful allocation of funds for advertising programs. The method of scoring this question was outlined in the method and procedure section of this chapter. The coded scores ranged from -1.483 to -0.430. Allocation of advertising funds score is used as a measure of the extent to which a general manager uses procedures which should lead to successful allocation of funds for advertising programs. A frequency distribution of coded allocation of advertising funds scores by category is presented in Table 44. The method of deciding how much money to spend on advertising is assumed to be a dimension of the more general category of managerial planning and decision making.

Employee management

The general manager is usually responsible for the selection, training and supervision of the employees of the local retail farm supply business. For the broad general area of employee management, two operational measures were developed. The two operational measures used are: 1) employee training score and 2) employee responsibility score. Although these two measures are not operational measures of the entire general category of employee management, it is assumed that these two areas are major dimensions of employee management.

Employee training   The general managers were asked to explain the methods which they used to train and develop their employees. Based on a general manager's response, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used by him to train employees would lead to successful employee training. The method of scoring was outlined in the method and procedure section of this chapter. The coded scores ranged from -0.497 to +1.174. A frequency distribution of the coded employee training scores by year and category appears in Table 45. The question used to obtain this score was included on both the before and after interview schedules. Employee training score is used as a measure of the extent to which a general manager uses procedures which should lead to successful employee training.

Table 45. Distribution of coded employee training scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
-2.326 to -.500	0	0.0	0	0.0	0	0.00
-.500 to +.500	5	62.5	4	80.0	9	69.23
+.500 to +2.326	3	37.5	1	20.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
After (1963)						
-2.326 to -.500	0	0.0	0	0.0	0	0.00
-.500 to +.500	8	100.0	4	80.0	12	92.31
+.500 to +2.326	0	0.0	1	20.0	1	7.69
Total	8	100.0	5	100.0	13	100.00
Means						
1961	0.362		0.471		0.404	
1963	0.100		0.199		0.138	

The null hypothesis of no difference between treatment and control general managers on beginning employee training scores was tested. The calculated F value was .29 which is not significant at the .05 probability level. Because the calculated F does not exceed the tabular F, it is concluded that the observed data do not provide evidence of significant difference on beginning employee training socres between treatment and control general managers.

Employee responsibility The general managers were asked how often they reviewed or evaluated the responsibilities and work load of each of their employees. They were also asked the procedures which they used in evaluating the responsibilities and work load of employees. Based on a general manager's responses to the above questions, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used would lead to successful assignment of responsibilities and work loads for employees. The method of scoring was outlined in the method and procedure section of the chapter. Employee responsibility score is used as a measure of the extent to which a general manager uses procedures which should lead to successful assignment of responsibilities and work loads for employees. The coded scores ranged from -1.978 to +0.989. A frequency distribution of the coded employee responsibility scores appears in Table 46. These questions were included only in the after interview schedule.

Table 46. Distribution of coded employee responsibility scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Coded score						
-2.326 to -.500	4	50.0	3	60.0	7	53.85
-.500 to +.500	1	12.5	1	20.0	2	15.38
+.500 to +2.325	3	37.5	1	20.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
Mean	-0.513		-0.609		-0.550	

Procurement management

For the broad general area of procurement management, two operational measures were developed: 1) selection of supplier score and 2) use of wholesale salesman score. Although these two indices are not operational measures of the entire area of procurement management, it is assumed that the two areas are major dimensions of procurement management.

Selection of supplier To obtain a measure of the factors which the general managers considered in the selection of suppliers, they were asked the following question during the 1963 interviewing: "What are the factors that you take into consideration when choosing your sources of supply?" For measurement purposes, the general managers were given one point for each relevant factor mentioned. Some of the factors discussed by Phillips are: type of supplier, kind of service rendered, time and method of delivery, differentials on quality and price, reputation of suppliers, brands available, freight costs and time required for shipment (95, pp. 449-452). Selection of supplier score is used as a measure of the extent to which a general manager considers relevant factors in his selection of suppliers. Considering relevant factors in selecting suppliers is assumed to be a dimension of the more general category of procurement management. The range was from 1 to 7. The distribution of scores by year and category is presented in Table 47.

Table 47. Distribution of selection of supplier scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 4	5	62.5	4	80.0	9	69.23
4 and over	3	37.5	1	20.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	6	75.0	4	80.0	10	76.92
Increased	2	25.0	1	20.0	3	23.08
Total	8	100.0	5	100.0	13	100.00

The null hypothesis of no difference between treatment and control general managers on beginning selection of supplier scores was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 47 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 47. The observed data do not present evidence that beginning selection of supplier scores for treatment and control general managers differ significantly.

Present use of wholesale salesman The general managers were asked during the final interviewing the following question: "In relation to your fertilizer department what help if any do you get from your suppliers?" Based on a general manager's response to this question, judges were asked to indicate on a scale of 1 to 99 how certain they were that the present use made of wholesale salesman indicate effective use (successful use) of wholesale salesmen. The method of scoring was outlined in the method and procedure section of this chapter. The coded scores ranged from -0.169 to +0.971. Present use of salesmen score is used as a measure of the extent to which a general manager is using wholesale salesmen effectively in his business operations. Present use of wholesale salesman in business operations is assumed to be a dimension of the more general category of procurement management. A frequency distribution of coded present use of salesman scores by category is presented in Table 48.

Table 48. Distribution of coded present use of salesman score by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Coded score						
-2.325 to -.500	0	0.0	0	0.0	0	0.00
-.500 to +.500	3	37.5	1	20.0	4	30.77
+.500 to +2.326	5	62.5	4	80.0	9	69.23
Total	8	100.0	5	100.0	13	100.00
Mean	0.615		0.511		0.575	

Agricultural chemical inventory management

The operational measure of agricultural chemical inventory management is based on responses by general managers to the question: "What factors do you consider in deciding the kinds and amounts of agricultural chemicals to keep in inventory?" This question was included only in the final interview schedule. Based on Phillip's discussion, some of the factors which could be included in a response to this question include: relationship between inventory levels and cost of carrying inventories, an adequate range of agricultural chemicals based on customer demand, relationship between inventory levels and sales volume, relationship between inventory levels and gross margins, inventory turnover, the seasonality of agricultural chemical sales, availability of chemicals from supplier, adjusting chemical inventory to price changes, a system or plan for controlling chemical inventories, purchasing chemicals in economical quantities, and minimizing shrinkage and quality deterioration (95). For measurement purposes, one point was given for each "reasonable" factor which was mentioned by a general manager. The scores ranged from 0 to 3. The distribution of scores by category is recorded in Table 49. Inventory management score is used as a measure of the extent to which a general manager considers relevant factors in determining the kinds and amounts of agricultural chemicals to keep in inventory.

Table 49. Distribution of inventory management scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 2	2	25.0	3	60.0	5	38.46
2 and over	6	75.0	2	40.0	8	61.54
Total	8	100.0	5	100.0	13	100.00

Credit management

Credit management is operationally defined in this research by a measure relating to determination of credit programs for customers. During both the 1961 and 1963 interviewing, the general managers were asked the following question: "How do you determine the amount of credit and the time limit for customer credits?" Based on a manager's response to this question, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used would lead to successful credit management. The method of scoring was outlined in the method and procedure section of this chapter. Credit management score is used as a measure of the extent to which a general manager uses procedures which will lead to successful credit management. The coded scores ranged from -0.695 to +0.695. A frequency distribution of coded credit management scores by year and category is presented in Table 50.

Table 50. Distribution of coded credit management scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
-2.326 to -.500	2	25.0	1	20.0	3	23.08
-.500 to +.500	5	62.5	3	60.0	8	61.54
+.500 to +2.326	1	12.5	1	20.0	2	15.38
Total	8	100.0	5	100.0	13	100.00
After (1963)						
-2.326 to -.500	1	12.5	1	20.0	2	15.38
-.500 to +.500	6	75.0	4	80.0	10	76.92
+.500 to +2.326	1	12.5	0	0.0	1	7.69
Total	8	100.0	5	100.0	13	99.99
Means						
1961	0.056		-0.079		0.004	
1963	-0.054		-0.336		-0.162	

The null hypothesis of no difference between treatment and control general managers on beginning credit management scores was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning credit management scores between treatment and control general managers.

Sales management

One of the areas of responsibility for the operational manager of the local retail farm supply businesses is planning and organizing the merchandising, promotional activities and advertising for the various departments of the business. In this research project, information was obtained about several direct selling, advertising and promotional activities which could be conducted in relation to the fertilizer department. The ones included in this section are the ones for which the general manager would have major responsibility. Those services which would involve board of directors' decisions are included in the next section. This division is mainly based on how much responsibility is delegated to the general manager. Services and promotional activities connected with the fertilizer department for which the general manager has major responsibility are operationally defined in this research by several measures relating to: 1) soil testing services, 2) educational activities, 3) advertising and promotional activities, 4) direct selling activities, and 5) discount practices.

Soil testing services To obtain a measure of a general manager's emphasis on a soil testing program, each general manager was asked if certain services related to soil testing were provided for farmer customers during the years of 1960, 1961 and 1963. These services were 1) test soil in own lab, 2) take soil samples for farmers, 3) send in soil samples for farmers, and 4) interpret soil tests results for farmers. An attempt was made to obtain a measure of changes made in these services. The procedures for interviewing the general managers about these services and the method of scoring are outlined in the method and procedure section of this chapter. For the years of 1961 and 1963, the range in scores was from -6 to +9. The distribution of scores by year and category appears in Table 51. The soil testing services change score is used as a measure of the extent to which a general manager has changed his emphasis on a soil testing program for farmer customers.

The null hypothesis of no difference between treatment and control general managers on number of soil testing services offered in 1960 was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 51 does not fall in the critical region of the probability distribution given

Table 51. Distribution of soil testing services scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)						
Offered less than 3	4	50.0	3	60.0	7	53.85
3 or more offered	4	50.0	2	40.0	6	46.15
Total	8	100.0	5	100.0	13	100.00
Interim (1961)						
Less than 1	2	25.0	1	20.0	3	23.08
1 to 4	3	37.5	2	40.0	5	38.46
More than 4	3	37.5	2	40.0	5	38.46
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Less than 1	3	37.5	3	60.0	6	46.15
1 to 4	2	25.0	1	20.0	3	23.08
More than 4	3	37.5	1	20.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
Means						
1961	4.0		3.6		3.85	
1963	3.0		2.0		2.62	
Average (1961 + 1963)	3.5		2.8		3.23	

the fixed marginal frequencies recorded in Table 51. The observed data do not present evidence that the number of soil testing services offered in 1960 by treatment and control general managers differ significantly.

Soil testing intensity score Another measure of the soil testing services provided for farmer customers is based on the intensity of use of certain soil testing services in 1963. General managers were asked to give the number of farmers for whom their business took soil samples and for whom their business tested soil samples or sent soil samples to a laboratory to be tested. They were also asked if they maintained a file of soil test reports for farmers whose samples their business had tested or sent to a laboratory to be tested. General managers were scored 1 point for every farmer for whom their business had taken soil samples, 1 point for every farmer for whom their business had had the soil samples tested, 1 point for every farmer for whom the samples represented all the cropland on the farm,

Table 52. Distribution of coded soil testing intensity scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 5	4	50.0	2	40.0	6	46.15
5 to 10	1	12.5	3	60.0	4	30.77
More than 10	3	37.5	0	0.0	3	23.08
Total	8	100.0	5	100.0	13	100.00
Mean	8.38		4.80		7.00	

and 10 points for having maintained a file on soil test reports. These scores were divided by 10 for analysis purposes. The coded scores ranged from 0 to 20. The frequency distribution of coded scores by category is presented in Table 52. The soil testing intensity score is used as a measure of the extent to which a general manager places emphasis on soil testing services.

Educational activities To obtain a measure of a general manager's emphasis on educational activities connected with the fertilizer department, each general manager was asked if certain services (activities) were provided for farmer customers during the years of 1960, 1961 and 1963. These activities were: 1) sponsor demonstration plots, 2) use specialists to help interpret results on demonstration plots, 3) help farmers set up and evaluate test plots on their own farms, 4) conduct or sponsor fertilizer clinics for customers, and 5) help farmers plan fertilizer programs. An attempt was made to obtain a measure of changes made in these services. The procedures for interviewing the general managers about these services and the method of scoring are outlined in the method and procedure section of this chapter. For the years of 1961 and 1963, the range in scores was from -9 to +9. The distribution of coded scores by year and category appears in Table 53. Educational activity (change) score is used as a measure of the extent to which a general manager has changed his emphasis on educational activities connected with the fertilizer department.

Table 53. Distribution of educational activity scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)						
1 or less offered	4	50.0	3	60.0	7	53.85
2 or more offered	4	50.0	2	40.0	6	46.15
Total	8	100.0	5	100.0	13	100.00
Interim (1961)						
Less than 1	2	25.0	3	60.0	5	38.46
1 to 5	5	62.5	2	40.0	7	53.85
More than 5	1	12.5	0	0.0	1	7.69
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Less than 1	5	62.5	3	60.0	8	61.54
1 to 5	3	37.5	2	40.0	5	38.46
More than 5	0	0.0	0	0.0	0	0.00
Total	8	100.0	5	100.0	13	100.00
Means						
1961	1.62		0.20		1.07	
1963	1.12		-0.60		0.46	
Average (1961 + 1963)	1.37		-0.20		0.77	

The null hypothesis of no difference between treatment and control general managers on number of educational activities conducted in 1960 was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 53 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 53. The observed data do not present evidence that the number of educational activities conducted in 1960 by treatment and control general managers differ significantly.

Fertilizer programs   Assisting farmers in planning fertilizer programs for their farms was one of the services included in the educational services which could be provided for farmer customers. To obtain an additional measure of intensity with which this service is offered, general managers were asked to give, by percent, the number of their fertilizer customers for whom they

_____a. Plan and carry out a complete fertilizer program.
_____b. Plan and carry out a majority of the aspects of a complete fertilizer program.
_____c. Plan and carry out some of the aspects of a complete fertilizer program.
_____d. Make recommendations and give advice only when requested.
_____e. Just sell them fertilizer.

This question was included only in the 1963 interview schedules. The general managers were allowed to define "complete fertilizer program" for themselves. It is recognized that they probably did not all define it in the same way.

For measurement purposes managers were scored 5 points for each percent they put under choice "a" (see above) down to 1 point for each percent of their fertilizer customers they classified under choice "e." The range in scores was from 150 to 419.

Fertilizer program intensity score is used as a measure of the extent to which a general manager places emphasis on planning and carrying out complete fertilizer programs for farmer customers. The distribution of fertilizer program intensity scores by category appears in Table 54.

Table 54. Distribution of fertilizer program intensity scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 200	2	25.0	1	20.0	3	23.08
200 to 300	3	37.5	2	40.0	5	38.46
More than 300	3	37.5	2	40.0	5	38.46
Total	8	100.0	5	100.0	13	100.00
Mean	262.50		282.80		270.31	

Advertising and promotional activities To obtain a measure of a general manager's emphasis on advertising and promotional activities connected with the fertilizer department, each general manager was asked if certain activities were carried out during the years of 1960, 1961 and 1963.

These activities included: 1) advertised fertilizer in a newspaper and/or on radio; 2) sent direct mailings to farmers; 3) used fair displays, booths, etc.; and 4) used floor displays to merchandise fertilizer. An attempt was made to obtain a measure of changes made in these services. The procedures for interviewing the general managers about these services and the method of scoring are outlined in the method and procedure section of this chapter. For the years of 1961 and 1963, the range in scores was from -4 to +6. The distribution of scores by year and category appears in Table 55. Advertising activity (change) score is used as a measure of the extent to which a general manager has changed his emphasis on advertising and promotional activities connected with the fertilizer department.

The null hypothesis of no difference between treatment and control general managers on number of advertising activities conducted in 1960 was

Table 55. Distribution of advertising activity scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)						
1 or less offered	3	37.5	2	40.0	5	38.46
2 or more offered	5	62.5	3	60.0	8	61.54
Total	8	100.0	5	100.0	13	100.00
Interim (1961)						
Less than 1	5	62.5	4	80.0	9	69.23
1 to 4	1	12.5	0	0.0	1	7.69
More than 4	2	25.0	1	20.0	3	23.08
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Less than 1	2	25.0	3	60.0	5	38.46
1 to 4	5	62.5	1	20.0	6	46.15
More than 4	1	12.5	1	20.0	2	15.38
Total	8	100.0	5	100.0	13	99.99
Means						
1961	1.12		-0.80		0.38	
1963	1.25		1.00		1.15	
Average (1961 + 1963)	1.18		0.10		0.76	

tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 55 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 55. The observed data do not present evidence that the number of advertising activities conducted in 1960 by treatment and control general managers differ significantly.

Discount practices To obtain a measure of a general manager's emphasis on discount practices connected with the fertilizer department, each general manager was asked if certain discounts were offered to farmer customers during the years of 1960, 1961 and 1963. These practices included: 1) give cash discounts, 2) offer volume discounts, 3) offer seasonal discounts, 4) use price discounts for competitive purposes, and 5) offer discounts to farmers hauling their own fertilizer. An attempt was made to obtain a measure of changes made in these services. The procedures for interviewing the general managers about these services and the method of scoring are outlined in the method and procedure section of this chapter. For the years of 1961 and 1963, the range in scores was from -9 to +4. The distribution of scores by year and category appears in Table 56. Discount

Table 56. Distribution of discount practices scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)						
2 or less offered	3	37.5	4	80.0	7	53.85
3 or more offered	5	62.5	1	20.0	6	46.15
Total	8	100.0	5	100.0	13	100.00
Interim (1961)						
Less than 1	5	62.5	3	60.0	8	61.54
1 to 4	3	37.5	2	40.0	5	38.46
More than 4	0	0.0	0	0.0	0	0.00
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Less than 1	7	87.5	4	80.0	11	84.62
1 to 4	1	12.5	1	20.0	2	15.38
More than 4	0	0.0	0	0.0	0	0.00
Total	8	100.0	5	100.0	13	100.00
Means						
1961	0.25		0.40		0.31	
1963	-0.51		-2.00		-1.08	
Average (1961 + 1963)	-0.13		-0.80		-0.38	

practices (change) score is used as a measure of the extent to which a general manager has changed his emphasis on discount practices.

The null hypothesis of no difference between treatment and control general managers on number of discount practices conducted in 1960 was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 56 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 56. The observed data do not present evidence that the number of discount practices conducted in 1960 by treatment and control general managers differ significantly.

Direct selling activities To obtain a measure of a general manager's emphasis on direct selling activities connected with the fertilizer department, the general managers were asked if certain activities were carried out with farmer customers during the years of 1960, 1961 and 1963. These activities included: 1) uses suggestive selling (suggest purchasing fertilizer in appropriate season), 2) do on-the-farm selling, and 3) promote off-season selling. An attempt was made to obtain a measure of changes made in these services. The procedures for interviewing the general managers about these services and the method of scoring is outlined in the method and procedures section of this chapter. For the years of 1961 and 1963, the range in scores was from -5 to +9. The distribution of scores by year and category appears in Table 57. Direct selling activity (change) score is used as a measure of the extent to which a general manager has changed his emphasis on direct selling activities connected with fertilizer department.

The null hypothesis of no difference between treatment and control general managers on number of direct selling activities carried out in 1960 was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies recorded in Table 57 does not fall in the critical region of the probability distribution given the fixed marginal frequencies. The observed data do not present evidence that the number of direct selling activities carried out in 1960 by treatment and control general managers differ significantly.

Table 57. Distribution of direct selling activity scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)						
2 or less offered	4	50.0	3	60.0	7	53.85
3 or more offered	4	50.0	2	40.0	6	46.15
Total	8	100.0	5	100.0	13	100.00
Interim (1961)						
Less than 1	3	37.5	2	40.0	5	38.46
1 to 3	4	50.0	0	0.0	4	30.77
More than 3	1	12.5	3	60.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Less than 1	3	37.5	4	80.0	7	53.85
1 to 3	2	25.0	1	20.0	3	23.08
More than 3	3	37.5	0	0.0	3	23.08
Total	8	100.0	5	100.0	13	100.01
Means						
1961	0.25		2.20		1.00	
1963	2.25		-0.20		1.31	
Average (1961 + 1963)	1.25		1.00		1.16	

Changes in Internal Environment and Activites of the Firm

Changes in internal environment and activities of the firm are operationally defined in this research by several specific measures relating to the function of advising strategic (over-all) management, goals of the business firm, fertilizer application services, and investment in facilities and equipment. The rationale for including these areas in this section was presented in the theoretical chapter of this report.

Advisory role

As pointed out in the theoretical section of this report, one of the general manager's responsibilities is providing advice and making recommendations to strategic (over-all) management. Operational measures were developed in the areas of facility and equipment policies, determination of business efficiency, determination of merchandising services to offer, determination of product lines and determination of capital requirements. It is assumed that these areas are dimensions of the more general category of providing advice and making recommendations to over-all management. The general managers must have methods for determining data on which to base their advice and recommendations. This is what is being measured in this research.

Facility and equipment policies   As stated by Phillips:

> Management of marketing and farm supply businesses is justifiably concerned with how adequate the plant facilities are for the uses made of them, and with the possibilities of increasing the net earnings of the business by modernization. (95, p. 326)

Adequacy is discussed by Phillips in regard to capacity and condition and in terms of obsolescence. It is assumed that one of the areas in which general managers have responsibility for providing advice and making recommendations to strategic (over-all) management is the area of facility and equipment policies.

The general managers were asked the following question during the 1963 interviewing:

> We are interested in knowing if you have any specific policies or criteria concerning replacement and repair of facilities and equipment. For example, let's take a truck that you use for farm deliveries. What factors do you take into consideration in determining how long to keep the truck, in other words, when to replace it?

Based on a general manager's reponse to these questions, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used would lead to successful formulation of replacement and repair policies. The method of scoring this question was outlined in the method and procedure section of this chapter. The coded scores ranged from -0.540 to +0.387. Equipment policy score is used as a measure of the extent to which procedures used should lead to successful formulation of replacement and repair policies for the business.

Use of efficiency ratios   One of the areas of management is determining efficiency of the business. Phillips states:

Table 58. Distribution of coded equipment policy scores by category

Year and category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
After (1963)						
Coded score						
-2.326 to -.500	0	0.0	1	20.0	1	7.69
-.500 to +.500	8	100.0	4	80.0	12	92.31
+.500 to +2.326	0	0.0	0	0.0	0	0.00
Total	8	100.0	5	100.0	13	100.00
Mean	0.049		-0.174		-0.037	

> After the areas to be controlled have been determined, the next step in setting up accounting controls for the business is to determine a realistic standard of performance for each area. . . . The measures reflecting the level of performance in each area of managerial control normally are efficiency measures. Broadly speaking, efficiency is measured by a ratio. . . . (95, p. 141)

It is assumed, that one of the areas in which general managers have responsibility for providing advice and making recommendations to strategic (overall) management is the area of determining the efficiency of the business.

The general managers were asked the following questions during the 1963 interviewing: "What kinds of ratios do you use to determine how efficient you are in your business?" "What should these ratios be for your business?" "What are the factors you take into consideration in deciding on these ratios?" Based on a general manager's response to these questions, judges were asked to indicate on a scale of 1 to 99 how certain they were that the procedures mentioned by the manager as being used would lead to successful determination of the efficiency of the business. The method of scoring this question was outlined in the method and procedure section of this chapter. The coded scores ranged from -1.053 to +0.126. Efficiency ratio score is used as a measure of the extent to which these procedures used should lead to successful determination of the efficiency of the business. A frequency distribution of coded efficiency ratio scores by category appears in Table 59.

Table 59. Distribution of coded efficiency ratio scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Coded score						
-2.326 to -.500	2	25.0	3	60.0	5	38.46
-.500 to +.500	6	75.0	2	40.0	8	61.54
+.500 to +2.326	0	0.0	0	0.0	0	0.00
Total	8	100.0	5	100.0	13	100.00
Mean	-0.232		-0.660		-0.397	

Merchandising services   A phase of long range planning is determining the merchandising services to offer. Phillips states:

> One of the important considerations in planning the products to handle and services to provide in local marketing and retail farm supply businesses is the selection services to most profitably supplement the products handled. (95, pp. 292-293)

It is assumed that one of the areas in which general managers have responsibility for providing advice and making recommendations to strategic (overall) management is the area of selection of services to supplement product merchandising.

During both the 1961 and 1963 interviewing, the general managers were asked the following question: "How do you determine which merchandising services to offer (such as soil testing, fertilizer spreading, agricultural chemicals application)?" Based on a general manager's response to this question, judges were asked to indicate on a scale of 1 to 99 how certain they were the procedures mentioned by the manager as being used would lead to successful determination of merchandising services to offer. The method of scoring this question was outlined in the method and procedure section of this chapter. The coded scores ranged from -0.642 to +1.282. Merchandising determination score is used as a measure of the extent to which the procedures used should lead to successful determination of merchandising services to offer. A frequency distribution of coded merchandising determination scores by year and category is presented in Table 60.

Table 60. Distribution of coded merchandising determination scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
-2.326 to -.500	0	0.0	0	0.0	0	0.00
-.500 to +.500	2	25.0	5	100.0	7	53.85
+.500 to +2.326	6	75.0	0	0.0	6	46.15
Total	8	100.0	5	100.0	13	100.00
After (1963)						
-2.326 to -.500	0	0.0	1	20.0	1	7.69
-.500 to +.500	6	75.0	2	40.0	8	61.54
+.500 to +2.326	2	25.0	2	40.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
Means						
1961	0.519		-0.012		0.315	
1963	0.306		0.238		0.280	

The null hypothesis of no difference between treatment and control general managers on beginning merchandising determination scores was tested. The calculated F value was 5.42 which is significant at the .05 probability level. Because the calculated F does exceed the tabular F, it is concluded that the observed data do provide evidence of a significant difference on beginning merchandising determination scores between treatment and control general managers.

Determining product lines Another phase of long range planning is consideration of factors involved in adding or dropping existing lines of business. General managers were asked what major factors they take into consideration in deciding to add or drop existing lines of business or reorganize their business to place greater emphasis on a given line. It is assumed that profit maximization is the overriding objective and answers general managers gave that support this objective are, for measurement purposes, considered correct. "Correct" answers include such answers as those considering present and potential demand trends, emphasis on those product lines in which marginal revenue is equal to or greater than marginal costs, how well the product complements other product lines, etc. For measurement purposes dealers were scored one point for each answer they gave which could be included in these categories. The range in scores was from 1 to 4. Product determination score is used as a measure of the extent to which relevant factors are considered in determining product lines. A frequency distribution of product determination scores by category is recorded in Table 61. This question was asked only in 1963.

Table 61. Distribution of product line determination scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 3	4	50.0	5	100.0	9	69.23
3 and over	4	50.0	0	0.0	4	30.77
Total	8	100.0	5	100.0	13	100.00

Capital requirements Projection of capital requirements is another step in making long range plans. One part of projecting capital requirements is to decide if money is going to have to be borrowed, especially for a major outlay such as new equipment or facilities. In 1963, general managers were asked what they take into consideration in determining if they are going to need to borrow money, and the amount needed, for investments they might be considering. An understanding of the situation involves considering the needed capital requirements. Some of the first steps in long range planning include projection of volume potentials, projecting margins and service charges, projecting sales and service income, projecting facility and equipment needs, and projecting personnel needs. Next, projections are made for capital needs for facilities, working capital and investments. Operating costs and net project liability and income are projected. After net income and capital requirements have been projected, the next step is to project the different requirements for cash and the different sources of cash coming into the business firm. How much financing will be needed can be determined by comparing projected cash receipts to projected outlay of cash. In other words, a general manager decides how much cash is required, compares this with his cash flow (the amount of cash he has in the bank from all sources), and from this decides if there is a need to borrow money. For measurement purposes general managers' answers to the question on considerations in borrowing money were assigned scores of from 1 to 4 based on the completeness of the answers in relation to the concept of cash needed vs. cash flow. Capital determination score is used as a measure of the extent to which relevant factors are considered in determining whether or not to borrow money and the amount needed. A frequency distribution of capital determination scores by category appears in Table 62.

Table 62. Distribution of capital determination scores by category

Category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
After (1963)						
Less than 3	4	50.0	5	100.0	9	69.23
3 and over	4	50.0	0	0.0	4	30.77
Total	8	100.0	5	100.0	13	100.00

Goals

In the theoretical section, a discussion of goals was presented along with the rationale for expecting changes in goals for the fertilizer and agricultural chemicals department. In this analysis, goals for the fertilizer and agricultural chemicals departments are operationally defined by three specific measures relating to effort to sell fertilizer, plans for the fertilizer department and effort expended to sell agricultural chemicals.

These areas are assumed to be dimensions of the more general category of operative goals for the business.

Effort to sell fertilizer The degree to which general managers feel that they and their businesses are competing for fertilizer business in their trade area is assumed to be an indication of their goals for the fertilizer department. General managers' perceptions of their competition and the extent of their effort to sell fertilizer were included in the items to develop this measure.

General managers were asked both before and after the training program how hard they were competing for the fertilizer business in their trade area. The managers were asked to select one of the following four answers.

_____ a. Pushing fertilizer as hard as I can and attempting to increase my share of the market.
_____ b. Making an effort to sell fertilizer to maintain my share of the market.
_____ c. I push fertilizer just enough to keep my customers from going elsewhere for the other products I handle.
_____ d. I let farmers know that I have fertilizer on hand so they can get it if needed.

These answers were scored from 3 to 0 going from "a" to "d." Because the responses to this question might reflect a change in the general manager's frame of reference between the first and last times they were asked this question, the scores were adjusted by the procedure outlined in the method and procedure section of this chapter. Fertilizer competition score is used as a measure of the extent to which emphasis, as perceived by the general manager, is placed on fertilizer sales. The distribution of responses to this item by year and category appears in Table 63.

The null hypothesis of no difference between treatment and control general managers on beginning fertilizer competition scores was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 63 for beginning fertilizer competition scores does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 63. The observed data do not present evidence that beginning fertilizer competition scores for treatment and control general managers differ significantly.

Table 63. Distribution of fertilizer competition scores by year and category

Year and category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
Before (1961)						
Less than 2	2	25.0	3	60.0	5	38.46
3	6	75.0	2	40.0	8	61.54
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	1	12.5	1	20.0	2	15.38
Increased	7	87.5	4	80.0	11	84.62
Total	8	100.0	5	100.0	13	100.00

Expansion plans Expansion plans are the intentions expressed by the general managers to increase the size of the fertilizer department of the business by selling more of the present fertilizer lines, adding new lines, increasing services in connection with any of their fertilizer lines, or any combination of these. The training program dealt with expansion in terms of long range planning, capital requirements and plant and facilities.

General managers were asked both before and after the training program what their five year projection was for their fertilizer department in terms of expansion. Their possible answers were:

_____ a. Plan to expand it greatly.
_____ b. Plan to expand it somewhat.
_____ c. Plan to keep up with increased demand but keep fertilizer at about the same percent of the total business.
_____ d. Plan to reduce the fertilizer end of the business.
_____ e. Plan to get out of fertilizer altogether.

The answers were scored by weighing them from 4 to 0 going from "a" to "e." Expansion plan score is used as a measure of the plans for expansion of the fertilizer department of the business as expressed by the general manager. The distribution of scores for this measure by year and category is recorded in Table 64.

The null hypothesis of no difference between treatment and control general managers on beginning expansion plan scores was tested by using the

Table 64. Distribution of expansion plan scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 3	2	25.0	0	0.0	2	15.38
3 and over[a]	6[a]	75.0	5	100.0	11	84.62
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	5	62.5	5	100.0	10	76.92
Increased	3	37.5	0	0.0	3	23.08
Total	8	100.0	5	100.0	13	100.00

[a] Only one of the general managers indicated answer "a" which is scored as 4.

exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 64 for beginning expansion plan score does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 64. The observed data do not present evidence that beginning expansion plan scores between treatment and control general managers differ significantly.

Effort to sell agricultural chemicals The degree to which general managers feel that they and their businesses are competing for agricultural chemicals business in their trade area is assumed to be an indication of their goals for the agricultural chemicals business. General managers' perceptions of their competition and the extent of their effort to sell agricultural chemicals were included in the item to develop this measure.

General managers were asked both before and after the training program how hard they were competing for the agricultural chemicals business in their trade area. They responded by selecting one of the following four answers:

_____ a. Pushing chemicals as hard as I can and attempting to increase my share of the market.
_____ b. Making an effort to sell chemicals to maintain my share of the market.
_____ c. I push chemicals just enough to keep my customers from going elsewhere for the other products I handle.
_____ d. I let farmers know that I have chemicals on hand so they can get them if needed.

These answers were scored from 3 to 0 going from "a" to "d." Because the responses to this question might reflect a change in the general managers' frame of reference between the first and last times they were asked this question, the scores were adjusted by the procedure outlined in the method and procedure section of this chapter. Agricultural chemicals competition score is used as a measure of the extent to which emphasis as perceived by the general manager is placed on agricultural chemicals sales. The distribution of agricultural chemicals competition scores by year and category appears in Table 65.

Table 65. Distribution of agricultural chemicals competition scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1961)						
Less than 2	7	87.5	3	60.0	10	76.92
3	1	12.5	2	40.0	3	23.08
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Did not increase	4	50.0	0	0.0	4	30.77
Increased	4	50.0	5	100.0	9	69.23
Total	8	100.0	5	100.0	13	100.00

The null hypothesis of no difference between treatment and control general managers on beginning chemical competition scores was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 65 for beginning chemical competition scores does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 65. The observed data do not present evidence that beginning chemical competition scores between treatment and control general managers differ significantly.

Fertilizer application services

To obtain a measure of emphasis on fertilizer application services, each general manager was asked if certain services related to fertilizer application were provided for farmer customers during the years of 1960, 1961 and 1963. These services were: 1) providing small dry fertilizer spreader(s), 2) spreading liquid fertilizer, 3) offering anhydrous application service, 4) providing delivery of bagged fertilizer, and 5) offering bulk application. An attempt was made to obtain a measure of changes made in these services. The procedures for interviewing the general managers about these services and the method of scoring are outlined in the method and procedure section of this chapter. For the years of 1961 and 1963, the range in scores was from -6 to +9. The distribution of scores by year and category appears in Table 66. Fertilizer application services (change) score is used as a measure of the extent to which a business, as perceived by the general manager, has changed emphasis on application services connected with fertilizer department.

The null hypothesis of no difference between treatment and control general managers on beginning fertilizer application services scores was tested by using the exact test for the difference between two proportions. At the .05 level, the arrangement of cell frequencies reported in Table 66 does not fall in the critical region of the probability distribution given the fixed marginal frequencies recorded in Table 66. The observed data do not present evidence that the number of fertilizer application services offered in 1960 by the business firms of treatment and control general managers differ significantly.

Assets

For the purposes of this analysis, investment in facilities and equipment are operationalized by two highly related measures representing various dimensions of the general level concept. These measures are: 1) total fixed assets and 2) fertilizer fixed assets. The frequency distributions for these indices by year and category are presented in Tables 67 and 68 respectively. For each measure, the test of the null hypothesis on beginning differences follows each table. The rationale for including

Table 66. Distribution of fertilizer application services scores by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)						
3 or less offered	3	37.5	2	40.0	5	38.46
4 or more offered	5	62.5	3	60.0	8	61.54
Total	8	100.0	5	100.0	13	100.00
Interim (1961)						
Less than 1	4	50.0	1	20.0	5	38.46
1 to 5	2	25.0	2	40.0	4	30.77
More than 5	2	25.0	2	40.0	4	30.77
Total	8	100.0	5	100.0	13	100.00
After (1963)						
Less than 1	0	0.0	0	0.0	0	0.00
1 to 5	4	50.0	3	60.0	7	53.85
More than 5	4	50.0	2	40.0	6	46.15
Total	8	100.0	5	100.0	13	100.00
Means						
1961	0.88		3.20		1.77	
1963	5.88		5.00		5.54	
Average (1961 + 1963)	3.38		4.10		3.66	

these measures in this analysis was presented in the theoretical orientations chapter and the computational procedures were discussed in the method and procedure section of this chapter.

Total fixed assets, in dollars, is used as a measure of the business firm's capital investment in land, equipment and buildings for the fertilizer department.

Fertilizer fixed assets, in dollars, is used as a measure of the business firm's capital investment in land, equipment and buildings for the fertilizer department.

Outcomes for the Firm from Operational Management

Outcomes for the business firm from operational management are categorized into total (entire) business, fertilizer department and agricultural chemicals department.

For the purposes of this analysis, economic returns to the entire (total) business are operationalized by a number of indices representing various

Table 67. Distribution of total fixed assets by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than $100,000	3	33.33	2	33.33	5	33.33
$100,000 to $250,000	3	33.33	2	33.33	5	33.33
More than $250,000	3	33.33	2	33.33	5	33.33
Total	9	99.99	6	99.99	15	99.99
Interim (1961)						
Less than $100,000	3	33.33	2	33.33	5	33.33
$100,000 to $250,000	2	22.22	2	33.33	4	26.67
More than $250,000	4	44.44	2	33.33	6	40.00
Total	9	99.99	6	99.99	15	100.00
After (1962)						
Less than $100,000	4	44.44	2	33.33	6	40.00
$100,000 to $250,000	2	22.22	1	16.67	3	20.00
More than $250,000	3	33.33	3	50.00	6	40.00
Total	9	99.99	6	100.00	15	100.00
Means						
1960	$182,339		$286,798		$224,122	
1961	$190,467		$286,056		$228,703	
1962	$186,425		$282,130		$224,707	
Average (1961 + 1962)	$188,446		$284,093		$226,705	

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[a] The null hypothesis of no difference between treatment and control general managers on beginning total fixed assets was tested. The calculated F value for transformed data was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning total fixed assets between treatment and control general managers.

Table 68. Distribution of fertilizer fixed assets by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than $10,000	5	55.56	2	33.33	7	46.67
$10,000 to $25,000	2	22.22	1	16.67	3	20.00
More than $25,000	2	22.22	3	50.00	5	33.33
Total	9	100.00	6	100.00	15	100.00
Interim (1961)						
Less than $10,000	5	55.56	2	33.33	7	46.67
$10,000 to $25,000	2	22.22	1	16.67	3	20.00
More than $25,000	2	22.22	3	50.00	5	33.33
Total	9	100.00	6	100.00	15	100.00
After (1962)						
Less than $10,000	4	44.44	1	16.67	5	33.33
$10,000 to $25,000	3	33.33	3	50.00	6	40.00
More than $25,000	2	22.22	2	33.33	4	26.67
Total	9	99.99	6	100.00	15	100.00
Means						
1960	$14,023		$22,705		$17,496	
1961	$16,587		$23,800		$19,472	
1962	$17,477		$20,518		$18,694	
Average (1961 + 1962)	$17,032		$22,159		$19,083	

[a] The null hypothesis of no difference between treatment and control general managers on beginning fertilizer fixed assets was tested. The calculated F value for transformed data was less than unity. It is concluded that the observed data do not provide evidence of a significant difference on beginning fertilizer fixed assets between treatment and control general managers.

dimensions of the general level concept. These indices are: 1) total net commodity sales, 2) total gross commodity margins, 3) total net operating revenue, 4) ratio of total net operating profits to total tangible operating assets, 5) ratio of total net operating profits to total fixed assets, 6) ratio of total gross commodity margins to total net commodity sales, 7) ratio of total net operating revenue to total net commodity sales, 8) ratio of total net operating profits to total net commodity sales, and 9) total production expense to total net commodity sales. The frequency distribution of these indices by year and category are presented in Tables 69 to 77 respectively. For each measure, the test of null hypothesis of no beginning differences follows each table. The rationale for including these indices in this analysis was presented in the theoretical orientations chapter and the general computational procedures were discussed in the method and procedure section of this chapter.

Total net commodity sales, in dollars, is used as a measure of the output of the business firm. The computational procedures were presented in the method and procedure section.

Total gross commodity margins, in dollars, is used as a measure of the gross profits of the business firm. The computational procedures were presented in the method and procedure section.

Total net operating revenue, in dollars, is used as a measure of the gross profits of the business firm. The computational procedures were presented in the method and procedure section. Also total net operating revenue is used as a measure of the profit maximizing objective of a general manager who must take all inputs as given.

Ratio of total net operating profits to total tangible operating assets is used as a measure of the profit maximizing objective of a general manager who is given a fixed amount of capital and is able to make final decisions regarding both current and fixed inputs. This ratio is computed by dividing total net operating profits by total tangible operating assets.

Ratio of total net operating profits to total fixed assets is used as a measure of the profit maximizing objective of a general manager who is able to change selected (current) inputs. This ratio is computed by dividing total net operating profits by total fixed assets.

Schermerhorn states: "The third group of ratios to be discussed are some of the more common ratios used for testing the profitability of an enterprise. Basically, there are two major groups of ratios used for this purpose: 1) ratios which measure profitability as related to investments; and 2) ratios which measure profitability as related to sales" (98, p. 25). Because the emphasis in this research is with operational management, the concern is with the second group as specified by Schermerhorn. Also, he states: "These ratios are generally referred to as 'operating ratios.' They identify each item on the income statement as a percentage of net sales" (98, p. 26). The next three ratios are some of the more common operating ratios used for this purpose.

Ratio of total gross commodity margins to total net commodity sales is an operating ratio which is used as a measure of the profitability of a business firm as related to sales. This is one of the more common ratios used for testing the profitability of a firm (98). This ratio is computed by dividing total gross commodity margins by total net commodity sales.

Ratio of total net operating revenue to total net commodity sales is an operating ratio which is used as a measure of the profitability of a business firm as related to sales. This is one of the more common ratios used for testing the profitability of a firm (98). This ratio is computed by dividing total net operating revenue by total net commodity sales.

Ratio of total net operating profits to total net commodity sales is an operating ratio which is used as a measure of the profitability of a business firm as related to sales. This is one of the more common ratios used for testing the profitability of a firm (98). This ratio is computed by dividing total net operating profits by total net commodity sales.

Ratio of total production expense to total net commodity sales is a ratio which is used as a measure of the relationship between operating expense items and commodity sales. This ratio is computed by dividing total production expense by total net commodity sales.

Economic returns to fertilizer department

For the purposes of this analysis, economic returns to the fertilizer department of the retail farm supply business are operationalized by four measures representing various dimensions of the general level concept. These measures are: 1) fertilizer net sales, 2) tons of fertilizer sold, 3) fertilizer net revenue, and 4) ratio of fertilizer net profits to fertilizer fixed assets. The frequency distributions for these measures by year and category are presented in Tables 78 to 81 respectively. For each measure,

Table 69. Distribution of total net commodity sales by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than $750,000	2	22.22	1	16.67	3	20.00
$750,000 to $1,000,000	5	55.56	2	33.33	7	46.67
More than $1,000,000	2	22.22	3	50.00	5	33.33
Total	9	100.00	6	100.00	15	100.00
Interim (1961)						
Less than $750,000	1	11.11	1	16.67	2	13.33
$750,000 to $1,000,000	6	66.67	2	33.33	8	53.33
More than $1,000,000	2	22.22	3	50.00	5	33.33
Total	9	100.00	6	100.00	15	99.99
After (1962)						
Less than $750,000	2	22.22	2	33.33	4	26.67
$750,000 to $1,000,000	4	44.44	1	16.67	5	33.33
More than $1,000,000	3	33.33	3	50.00	6	40.00
Total	9	99.99	6	100.00	15	100.00
Means						
1960	$777,948		$1,230,141		$ 958,825	
1961	$778,847		$1,214,380		$ 953,060	
1962	$864,126		$1,313,580		$1,043,907	
Average (1961 + 1962)	$821,486		$1,263,980		$ 998,484	

[a] The null hypothesis of no difference between treatment and control general managers on beginning total net commodity sales was tested. The calculated F value for transformed data was 1.60 which is not significant at the .05 probability level. Because the calculated F does not exceed the tabular F, it is concluded that the observed data do not provide evidence of significant difference on beginning total net commodity sales between treatment and control general managers.

Table 70. Distribution of total gross commodity margins by year and category

Year and category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
Before (1960)[a]						
Less than $50,000	4	44.44	1	16.67	5	33.33
$50,000 to $100,000	4	44.44	3	50.00	7	46.67
More than $100,000	1	11.11	2	33.33	3	20.00
Total	9	99.99	6	100.00	15	100.00
Interim (1961)						
Less than $50,000	4	44.44	1	16.67	5	33.33
$50,000 to $100,000	3	33.33	3	50.00	6	40.00
More than $100,000	2	22.22	2	33.33	4	26.67
Total	9	99.99	6	100.00	15	100.00
After (1962)						
Less than $50,000	3	33.33	1	16.67	4	26.67
$50,000 to $100,000	4	44.44	3	50.00	7	46.67
More than $100,000	2	22.22	2	33.33	4	26.67
Total	9	99.99	6	100.00	15	100.01
Means						
1960	$54,355		$117,236		$79,507	
1961	$66,349		$132,294		$92,727	
1962	$75,123		$122,139		$93,929	
Average (1961 + 1962)	$70,736		$127,216		$93,328	

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[a] The null hypothesis of no difference between treatment and control general managers on beginning total gross commodity margins was tested. The calculated F value was 2.40 which is not significant at the .05 probability level. Because the calculated F does not exceed the tabular F, it is concluded that the observed data do not provide evidence of significant difference on beginning total gross commodity margins between treatment and control general managers.

Table 71. Distribution of total net operating revenue by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than $100,000	4	44.44	1	16.67	5	33.33
$100,000 to $175,000	3	33.33	3	50.00	6	40.00
More than $175,000	2	22.22	2	33.33	4	26.67
Total	9	99.99	6	100.00	15	100.00
Interim (1961)						
Less than $100,000	4	44.44	1	16.67	5	33.33
$100,000 to $175,000	3	33.33	3	50.00	6	40.00
More than $175,000	2	22.22	2	33.33	4	26.67
Total	9	99.99	6	100.00	15	100.00
After (1962)						
Less than $100,000	3	33.33	1	16.67	4	26.67
$100,000 to $175,000	5	55.56	3	50.00	8	53.33
More than $175,000	1	11.11	2	33.33	3	20.00
Total	9	100.00	6	100.00	15	100.00
Means						
1960	$113,531		$208,240		$151,415	
1961	$117,712		$206,603		$153,268	
1962	$117,895		$202,341		$151,674	
Average (1961 + 1962)	$117,804		$204,472		$152,471	

[a] The null hypothesis of no difference between treatment and control general managers on beginning total net operating revenue was tested. The calculated F value was 1.96 which is not significant at the .05 probability level. Because the calculated F does not exceed the tabular F, it is concluded that the observed data do not provide evidence of significant difference on beginning total net operating revenue between treatment and control general managers.

Table 72. Distribution for ratio of total net operating profits to total tangible operating assets by year and category

Year and category	Treatment No.	Treatment %	Control No.	Control %	Total No.	Total %
Before (1960)[a]						
Less than .050	3	33.33	0	0.00	3	20.00
.050 to .100	1	11.11	3	50.00	4	26.67
More than .100	5	55.56	3	50.00	8	53.33
Total	9	100.00	6	100.00	15	100.00
Interim (1961)						
Less than .050	2	22.22	0	0.00	2	13.33
.050 to .100	1	11.11	4	66.67	5	33.33
More than .100	6	66.67	2	33.33	8	53.33
Total	9	100.00	6	100.00	15	99.99
After (1962)						
Less than .050	2	22.22	2	33.33	4	26.67
.050 to .100	3	33.33	2	33.33	5	33.33
More than .100	4	44.44	2	33.33	6	40.00
Total	9	99.99	6	99.99	15	100.00
Means						
1960	.06860		.12065		.08942	
1961	.07541		.09592		.08361	
1962	.07352		.07827		.07542	
Average (1961 + 1962)	.07446		.08710		.07952	

[a] The null hypothesis of no difference between treatment and control general managers on beginning ratio of total net operating profits to total tangible operating assets was tested. The calculated F was 1.23 which is not significant at the .05 probability level. Because the calculated F does not exceed the tabular F, it is concluded that the observed data do not provide evidence of significant difference on beginning ratio of total net operating profits to total tangible operating assets between treatment and control general managers.

Table 73. Distribution for ratio of total net operating profits to total fixed assets by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than .150	4	44.44	2	33.33	6	40.00
.150 to .250	3	33.33	1	16.67	4	26.67
More than .250	2	22.22	3	50.00	5	33.33
Total	9	99.99	6	100.00	15	100.00
Interim (1961)						
Less than .150	3	33.33	2	33.33	5	33.33
.150 to .250	3	33.33	2	33.33	5	33.33
More than .250	3	33.33	2	33.33	5	33.33
Total	9	99.99	6	99.99	15	99.99
After (1962)						
Less than .150	5	55.56	4	66.67	9	60.00
.150 to .250	1	11.11	0	0.00	1	6.67
More than .250	3	33.33	2	33.33	5	33.33
Total	9	100.00	6	100.00	15	100.00
Means						
1960	.15410		.24152		.18907	
1961	.20157		.19967		.20081	
1962	.22200		.16553		.19941	
Average (1961 + 1962)	.21178		.18260		.20011	

[a] The null hypothesis of no difference between treatment and control general managers on beginning ratio of total net operating profits to total fixed assets was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning ratio of total net operating profits to total fixed assets between treatment and control general managers.

Table 74. Distribution for ratio of total gross commodity margin to total net commodity sales by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than .050	2	22.22	1	16.67	3	20.00
.050 to .100	5	55.56	3	50.00	8	53.33
More than .100	2	22.22	2	33.33	4	26.67
Total	9	100.00	6	100.00	15	100.00
Interim (1961)						
Less than .050	2	22.22	0	0.00	2	13.33
.050 to .100	4	44.44	4	66.67	8	53.33
More than .100	3	33.33	2	33.33	5	33.33
Total	9	99.99	6	100.00	15	99.99
After (1962)						
Less than .050	1	11.11	0	0.00	1	6.67
.050 to .100	5	55.56	4	66.67	9	60.00
More than .100	3	33.33	2	33.33	5	33.33
Total	9	100.00	6	100.00	15	100.00
Means						
1960	.07651		.09147		.08249	
1961	.08831		.10400		.09459	
1962	.09251		.09178		.09222	
Average (1961 + 1962)	.09041		.09789		.09340	

[a] The null hypothesis of no difference between treatment and control general managers on beginning ratio of total gross commodity margins to total net commodity sales was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning ratio of total gross commodity margins to total net commodity sales between treatment and control general managers.

Table 75. Distribution for ratio of total net operating revenue to total net commodity sales by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than .1200	5	55.56	1	16.67	6	40.00
.1200 to .1600	0	0.00	3	50.00	3	20.00
More than .1600	4	44.44	2	33.33	6	40.00
Total	9	100.00	6	100.00	15	100.00
Interim (1961)						
Less than .1200	4	44.44	0	0.00	4	26.67
.1200 to .1600	1	11.11	3	50.00	4	26.67
More than .1600	4	44.44	3	50.00	7	46.67
Total	9	99.99	6	100.00	15	100.01
After (1962)						
Less than .1200	4	44.44	1	16.67	5	33.33
.1200 to .1600	1	11.11	2	33.33	3	20.00
More than .1600	4	44.44	3	50.00	7	46.67
Total	9	99.99	6	100.00	15	100.00
Means						
1960	.14098		.15978		.14850	
1961	.14714		.16308		.15352	
1962	.13644		.14885		.14141	
Average (1961 + 1962)	.14179		.15596		.14746	

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[a] The null hypothesis of no difference between treatment and control general managers on beginning ratio of total net operating revenue to total net commodity sales was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning ratio of total net operating income to total net commodity sales between treatment and control general managers.

Table 76. Distribution for ratio of total net operating profits to total net commodity sales by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than .040	3	33.33	3	50.00	6	40.00
.040 to .080	5	55.56	2	33.33	7	46.67
More than .080	1	11.11	1	16.67	2	13.33
Total	9	100.00	6	100.00	15	100.00
Interim (1961)						
Less than .040	4	44.44	4	66.67	8	53.33
.040 to .080	4	44.44	1	16.67	5	33.33
More than .080	1	11.11	1	16.67	2	13.33
Total	9	99.99	6	100.01	15	99.99
After (1962)						
Less than .040	6	66.67	4	66.67	10	66.67
.040 to .080	3	33.33	2	33.33	5	33.33
More than .080	0	0.00	0	0.00	0	0.00
Total	9	100.00	6	100.00	15	100.00
Means						
1960	.02539		.04843		.03461	
1961	.02418		.04250		.03151	
1962	.01969		.03373		.02531	
Average (1961 + 1962)	.02194		.03812		.02841	

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[a] The null hypothesis of no difference between treatment and control general managers on beginning ratio of total net operating profits to total net commodity sales was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning ratio of total net operating profits to total net commodity sales between treatment and control general managers.

Table 77. Distribution for ratio of total production expense to total net commodity sales by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than .09000	4	44.44	1	16.67	5	33.33
.09000 to .1400	1	11.11	5	83.33	6	40.00
More than .1400	4	44.44	0	0.00	4	26.67
Total	9	99.99	6	100.00	15	100.00
Interim (1961)						
Less than .09000	3	33.33	0	0.00	3	20.00
.09000 to .1400	3	33.33	5	83.33	8	53.33
More than .1400	3	33.33	1	16.67	4	26.67
Total	9	99.99	6	100.00	15	100.00
After (1962)						
Less than .09000	3	33.33	0	0.00	3	20.00
.09000 to .1400	3	33.33	5	83.33	8	53.33
More than .1400	3	33.33	1	16.67	4	26.67
Total	9	99.99	6	100.00	15	100.00
Means						
1960	.11560		.11133		.11389	
1961	.12299		.12055		.12201	
1962	.11674		.11512		.11609	
Average (1961 + 1962)	.11986		.11783		.11905	

[a] The null hypothesis of no difference between treatment and control general managers on beginning ratio of total production expenses to total business net commodity sales was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning ratio of total production expenses divided by total net commodity sales between treatment and control general managers.

Table 78. Distribution of fertilizer net sales by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than $40,000	4	44.44	2	33.33	6	40.00
$40,000 to $70,000	2	22.22	2	33.33	4	26.67
More than $70,000	3	33.33	2	33.33	5	33.33
Total	9	99.99	6	99.99	15	100.00
Interim (1961)						
Less than $40,000	4	44.44	3	50.00	7	46.67
$40,000 to $70,000	2	22.22	1	16.67	3	20.00
More than $70,000	3	33.33	2	33.33	5	33.33
Total	9	99.99	6	100.00	15	100.00
After (1962)						
Less than $40,000	2	22.22	1	16.67	3	20.00
$40,000 to $70,000	3	33.33	2	33.33	5	33.33
More than $70,000	4	44.44	3	50.00	7	46.67
Total	9	99.99	6	100.00	15	100.00
Means						
1960	$65,618		$86,705		$74,053	
1961	$75,184		$84,457		$78,894	
1962	$93,202		$97,573		$94,950	
Average (1961 + 1962)	$84,193		$91,015		$86,922	

[a] The null hypothesis of no difference between treatment and control general managers on beginning fertilizer net sales was tested. The calculated F value for transformed data was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning fertilizer net sales between treatment and control general managers.

Table 79. Distribution of tons of fertilizer sold by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than 500	5	55.56	2	33.33	7	46.67
500 to 1,000	1	11.11	2	33.33	3	20.00
More than 1,000	3	33.33	2	33.33	5	33.33
Total	9	100.00	6	99.99	15	100.00
Interim (1961)						
Less than 500	4	44.44	1	16.67	5	33.33
500 to 1,000	2	22.22	3	50.00	5	33.33
More than 1,000	3	33.33	2	33.33	5	33.33
Total	9	99.99	6	100.00	15	99.99
After (1962)						
Less than 500	2	22.22	1	16.67	3	20.00
500 to 1,000	3	33.33	2	33.33	5	33.33
More than 1,000	4	44.44	3	50.00	7	46.67
Total	9	99.99	6	100.00	15	100.00
Means						
1960	842		1,269		1,013	
1961	994		1,266		1,103	
1962	1,211		1,409		1,290	
Average (1961 + 1962)	1,102		1,338		1,196	

[a] The null hypothesis of no difference between treatment and control general managers on beginning tons of fertilizer sold was tested. The calculated F value for transformed data was less than unity. It is concluded that the observed data do not provide evidence of a significant difference on beginning tons of fertilizer sold between treatment and control general managers.

Table 80. Distribution of fertilizer net revenue by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than $5,000	4	44.44	3	50.00	7	46.67
$5,000 to $10,000	2	22.22	1	16.67	3	20.00
More than $10,000	3	33.33	2	33.33	5	33.33
Total	9	99.99	6	100.00	15	100.00
Interim (1961)						
Less than $5,000	4	44.44	2	33.33	6	40.00
$5,000 to $10,000	3	33.33	2	33.33	5	33.33
More than $10,000	2	22.22	2	33.33	4	26.67
Total	9	99.99	6	99.99	15	100.00
After (1962)						
Less than $5,000	3	33.33	3	50.00	6	40.00
$5,000 to $10,000	3	33.33	1	16.67	4	26.67
More than $10,000	3	33.33	2	33.33	5	33.33
Total	9	99.99	6	100.00	15	100.00
Means						
1960	$10,898		$12,837		$11,673	
1961	$12,778		$13,700		$13,147	
1962	$16,826		$14,191		$15,772	
Average (1961 + 1962)	$14,802		$13,946		$14,460	

[a] The null hypothesis of no difference between treatment and control general managers on beginning fertilizer net revenue was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning fertilizer net revenue between treatment and control general managers.

Table 81. Distribution for ratio of fertilizer net profit to fertilizer fixed assets by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than .1500	4	44.44	2	33.33	6	40.00
.1500 to .2000	1	11.11	1	16.67	2	13.33
More than .2000	4	44.44	3	50.00	7	46.67
Total	9	99.99	6	100.00	15	100.00
Interim (1961)						
Less than .1500	3	33.33	5	83.33	8	53.33
.1500 to .2000	2	22.22	0	0.00	2	13.33
More than .2000	4	44.44	1	16.67	5	33.33
Total	9	99.99	6	100.00	15	99.99
After (1962)						
Less than .1500	4	44.44	5	83.33	9	60.00
.1500 to .2000	0	0.00	0	0.00	0	0.00
More than .2000	5	55.56	1	16.67	6	40.00
Total	9	100.00	6	100.00	15	100.00
Means						
1960	.41962		.16407		.31740	
1961	.36224		.11170		.26203	
1962	.24031		.10935		.18793	
Average (1961 + 1962)	.30128		.11053		.22498	

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[a] The null hypothesis of no difference between treatment and control general managers on beginning ratio of fertilizer net operating profit to average fertilizer fixed assets was tested. The calculated F value was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning ratio of fertilizer net operating profit to average fertilizer fixed assets between treatment and control general managers.

the test of null hypothesis of no beginning difference between treatment and control follows each table. The rationale for including these measures in this analysis was presented in the theoretical orientations chapter and the general computational procedures were discussed in the method and procedure section of this chapter.

Fertilizer net sales, in dollars, is used as a measure of the output of the fertilizer department of the retail farm supply business. The computational procedures were presented in the method and procedure section.

Tons of fertilizer sold is used as a measure of output in terms of number of tons of fertilizer sold by the business.

Fertilizer net revenue, in dollars, is used as a measure of gross profits of the fertilizer department of the business. The computational procedures were presented in the method and procedure section.

Ratio of fertilizer net revenue to fertilizer fixed assets is used as a measure of the profit maximizing objective of a general manager who is able to change selected (current) inputs. Also, independence between the fertilizer operation and the other operations of the business is assumed for this measure. This ratio is computed by dividing fertilizer net revenue by fertilizer fixed assets.

Economic returns to agricultural chemicals department

Only one economic measure is computed for economic returns for the agricultural chemicals department. Agricultural chemicals net sales, in dollars, is used as a measure of output of the agricultural chemicals department of the business. The distribution of agricultural chemicals net sales by year and category appears in Table 82.

Table 82. Distribution of agricultural chemicals net sales by year and category

Year and category	Treatment		Control		Total	
	No.	%	No.	%	No.	%
Before (1960)[a]						
Less than $2,500	2	22.22	1	16.67	3	20.00
$2,500 to $5,000	5	55.56	3	50.00	8	53.33
More than $5,000	2	22.22	2	33.33	4	26.67
Total	9	100.00	6	100.00	15	100.00
Interim (1961)						
Less than $2,500	1	11.11	1	16.67	2	13.33
$2,500 to $5,000	4	44.44	1	16.67	5	33.33
More than $5,000	4	44.44	4	66.67	8	53.33
Total	9	99.99	6	100.01	15	99.99
After (1962)						
Less than $2,500	1	11.11	1	16.67	2	13.33
$2,500 to $5,000	3	33.33	1	16.67	4	26.67
More than $5,000	5	55.56	4	66.67	9	60.00
Total	9	100.00	6	100.01	15	100.00
Means						
1960	$4,546		$6,660		$5,392	
1961	$6,881		$8,680		$7,601	
1962	$6,772		$8,087		$7,298	
Average (1961 + 1962)	$6,826		$8,384		$7,450	

[a] The null hypothesis of no difference between treatment and control general managers on beginning chemical net sales was tested. The calculated F value for transformed data was less than unity. It is concluded that the observed data do not provide evidence of significant difference on beginning chemical net sales between treatment and control general managers.

Chapter 5

FINDINGS

Introduction

This chapter will be divided into two major parts: 1) findings and 2) discussion of findings and measures. The general and supporting hypotheses were derived in the Theoretical Orientations chapter and the measures designed to operationalize the theoretical concepts which were included in these hypotheses were presented in the Methodology chapter. The next steps are to formulate the empirical hypotheses and test them for statistical significance. From these tests, inferences will be made about the supporting and general hypotheses.

The operational definition is used to more precisely define a theoretical concept. It describes the operations which observe, measure and record a given phenomenon (41). Northrop has referred to the relation between the theoretical concept and the corresponding empirical operationalizations of that concept as an "epistemic correlation" (82, pp. 122-123). In this research, because of the multidimensional nature of the theoretical concepts, each concept was operationalized by a group or cluster of measures which appear to be logically related to the theoretical concepts. Inferences made about the general and supporting hypotheses based on the results of testing the empirical hypotheses is limited by the validity of the epistemic correlations. In this research, the second limitation of the inferences concerning the validity of the general and supporting hypotheses is the small sample size. When valid statistical inferences are to be made about a relevant population it is necessary to sample a sufficient number of observations from that population. If this is not done, the statistical tests may not have sufficient power to detect differences which may exist. When commenting on the results of a t-test where the sample sizes were 12 and 11 observations, Walker and Lev state:

> It must, however, be noted that when samples are small and variability large, the observed differences must be very large to appear significant. The failure to find a significant difference may be due to the small number of cases examined rather than to the equality of population means. (126, p. 157)

The use of a particular statistical test presupposes a certain level of measurement and certain assumptions about the mathematical model used. One of the problems in very small samples is that there are not enough cases in the sample to obtain sufficient information about the form of the population distribution or to check the validity of the statistical assumptions. Thus, a violation of a statistical assumption and/or inadequate sample size may consequently lead to invalid probability statements and/or erroneous conclusions. Also, in this research, certain research measures were bounded, i.e., an upper limit was set on the measure. In some cases the general managers were near this upper limit at the beginning of the program which limited the possibility of measuring change. Both the training program and the research effort connected with it were exploratory in nature and a small sample size was used in order that measures of changes could be obtained in many areas. Limitations of funds and resources prevented a larger sample in the research phase. The reader is cautioned to keep in mind the above limitations and the ones mentioned in the methodology chapter as the findings are presented.

The procedure to be followed in the first part of the chapter will be to state the general hypothesis and supporting hypotheses and to follow each supporting hypothesis with the statement of the empirical hypothesis. The general and supporting hypotheses are stated in the same order in which they were derived. Each empirical hypothesis will then be stated and the results of the statistical tests of these hypotheses will be presented. For all tests of significance the .05 level of probability is taken as an acceptable indication of a statistically significant relationship. For the exact test of difference between two proportions the probability will be stated. In the discussion section of this chapter, the tests which were significant at the .10 level of probability will be mentioned.

In the second part of the chapter a summary of findings will be presented and selected measures discussed.

Statement and Tests of Empirical Hypotheses

General Hypothesis 1: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge of those content areas included in the training program than will similar general managers not participating in the same training program.

Supporting Hypothesis 1: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge about fertilizer than will similar general managers not participating in the same training program.

Empirical Hypothesis 1:[1] Treatment general managers will increase their scores on the fertilizer principles knowledge scale to a greater extent than will control general managers. The null form is: Treatment general managers will not increase their scores on the fertilizer knowledge score more than will control general managers.[2] The sum of the probabilities for the set of cell frequencies for 1963 recorded in Table 10 on page 163 which are more extreme, in favor of the treatment general managers, with the marginal total remaining the same is .3155.[3] At the .05 level, this is not a significant value. The null hypothesis is not refuted. These data do not support the original proposition.

E. H. 2: Treatment general managers will have higher demonstration purpose scores than will control general managers. The sum of the probabilities for the set of cell frequencies recorded in Table 11 and all other possible sets of cell frequencies which are more extreme, in favor of the treatment general managers, with the marginal totals remaining the same is .3155.[1] At the .05 level, this is not a significant value. These data do not support the original proposition.

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[1] The designation of E. H. will be used for Empirical Hypothesis in the remainder of the report.

[2] For statistical purposes, hypotheses should be stated in the null form and accepted or rejected in that form and that acceptance or rejection be related to the original hypothesis as is done here in Empirical Hypothesis 1. This was done in all the relevant cases below. However, to save space and avoid redundancy the null form will not be stated in the remaining hypotheses.

[3] When the exact test of difference between two proportions is used, all the sets of cell frequencies which are more extreme than the observed one are summed to determine the probability of obtaining the observed set and others which are more extreme. For a directional test, only the ones more extreme in a given direction are summed. In this case, it is those more extreme "in favor of treatment general managers."

E. H. 3: Treatment general managers will have higher fertilizer program scores than will control general managers. The sum of probabilities for the set of cell frequencies recorded in Table 12 on page 166 and all other possible sets of cell frequencies which are more extreme, in favor of the treatment general managers, with the marginal totals remaining the same is .0318. At the .05 level, this is a significant value. These data do support the original proposition.

Supporting Hypothesis 2: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge about agricultural chemicals than will similar general managers not participating in the same training program.

E. H. 4: Treatment general managers will increase their scores on chemical principles knowledge scale to a greater extent than will control general managers. The sum of the probabilities for the set of cell frequencies for 1963 recorded in Table 13 on page 168 and all other possible sets of cell frequencies which are more extreme, in favor of the treatment general managers, with the marginal totals remaining the same is .3155. At the .05 level, this is not a significant value. These data do not support the original proposition.

Supporting Hypothesis 3: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge about their farmer customers than will similar general managers not participating in the same training program.

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[1] When the measure was obtained only after the training, the distribution of observations were dichotomized as close to the medium for the total (treatment + control) as possible when the exact test is used.

E. H. 5: Treatment general managers will increase their farmers' expectations of fertilizer dealer scores to a greater extent than will control general managers. The probability for set of cell frequencies for 1963 recorded in Table 14 on page 169 with the marginal totals remaining the same is .4895. These data do not support the original proposition.

E. H. 6: Treatment general managers will increase their farmers' expectations of agricultural chemicals dealer scores to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 15 on page 171 with the marginal totals remaining the same is .3590. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 7: Treatment general managers will increase their potential fertilizer use scores to a greater extent than will control general managers. The set of cell frequencies for 1963 recorded in Table 16 on page 172 is in favor of the control general managers. These data do not support the original proposition. The probability for that set of cell frequencies with the marginal totals remaining the same is .16317.

E. H. 8: Treatment general managers will have higher limiting factor scores than will control general managers. The sum of the probabilities for the set of cell frequencies recorded in Table 17 on page 174 and all other possible sets of cell frequencies which are more extreme, in favor of the treatment general managers, with the marginal totals remaining the same is .0862. At the .05 level, this is not a significant value. These data do not support the original proposition.

Supporting Hypothesis 4: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge about business management than will similar general managers not participating in the same training program.

E. H. 9: Treatment general managers will identify a larger number of management functions than will control general managers. The sum of probabilities for the set of cell frequencies recorded in Table 18 on page 175 and all other possible sets of cell frequencies which are more extreme, in favor of the treatment general managers, with the marginal totals remaining the same is .1188. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 10: Treatment general managers will have higher margin determination scores than will control general managers. The probability for the set of cell frequencies recorded in Table 19 on page 177 with the marginal totals remaining the same is .4079. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 11: Treatment general managers will have higher present value of money scores than will control general managers. The probability for the set of cell frequencies recorded in Table 20 on page 178 with the marginal totals remaining the same is .0435. Given these marginal totals, this is the most extreme distribution which is in favor of the treatment general managers. At the .05 level, this is a significant value. These data do support the original proposition.

General Hypothesis 2: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes related to those content areas included in the training program than will similar general managers not participating in the same training program.

Supporting Hypothesis 5: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes toward fertilizer than will similar general managers not participating in the same training program.

E. H. 12: Treatment general managers will increase their scores on perceived importance of fertilizer department index to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 21 on page 180 with the marginal totals remaining the same is .0979. At the .05 level, this is not a significant value. These data do not support the original proposition. Although not significant at .05 level, given these marginal totals, this is the most extreme distribution which is in favor of the treatment general managers.

E. H. 13: Treatment general managers will increase their scores on general attitudes toward fertilizer index to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 22 on page 181 with the marginal totals remaining the same is .4079. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 14: Treatment general managers will have higher scores on perceived importance of planning farmer fertilizer programs to business success index than will control general managers. The probability for the set of cell frequencies recorded in Table 23 on page 182 with the marginal totals remaining the same is .4315. At the .05 level, this is not a significant value. These data do not support the original proposition.

Supporting Hypothesis 6: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes toward agricultural chemicals than will similar general managers not participating in the same training program.

E. H. 15: Treatment general managers will increase their scores on perceived importance of agricultural chemicals department index to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 24 on page 183 with the marginal totals remaining the same is .1958. At the .05 level, this is not a significant value. These data do not support the original proposition. Although not significant at .05 level, given these marginal totals, this is the most extreme distribution in favor of treatment general managers.

Supporting Hypothesis 7: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes toward operational management than will similar general managers not participating in the same training program.

E. H. 16: Treatment general managers will increase their scores on opinion leadership (fertilizer) index to a greater extent than will control general managers. The control general managers increased their mean score and the treatment general managers decreased their mean score. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 25 on page 185. The F value computed from the adjusted treatment and adjusted error mean squares was 4.56. If the hypothesis had not been stated directional, this value would not have been significant at .05 probability level for a non-directional test.

E. H. 17: Treatment general managers will have higher scores on fertilizer dealer responsibility index than will control general managers. Twelve of the 13 general managers had a score of 3 which is the maximum on this measure. These data do not support the original proposition. The data used to test this hypothesis are reported in Table 26 on page 186.

E. H. 18: Treatment general managers will have higher scores on providing technical fertilizer information index than will control general managers. The probability for the set of cell frequencies recorded in Table 27 on page 187 with the marginal totals remaining the same is .3916. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 19: Treatment general managers will have higher scores on perceived importance of planning farmer fertilizer programs index than will control general managers. The probability for the set of cell frequencies recorded in Table 28 on page 187 with the marginal totals remaining the same is .3916. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 20: Treatment general managers will increase their scores on opinion leadership (agricultural chemicals) index to a greater extent than will control dealers. The control general managers increased their mean score and the treatment general managers decreased their mean score. These data do not support the original proposition. The data used to test this hypothesis are reported in Table 29 on page 189. The F value computed from the adjusted treatment and adjusted error mean square was 8.42. If the hypothesis had not been stated directional, this value would be significant at .05 probability level for a non-directional test.

E. H. 21: Treatment general managers will have higher scores on agricultural chemicals dealer responsibility index than will control general managers. The probability for the set of cell frequencies recorded in Table 30 on page 190 with the marginal totals remaining the same is .3916. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 22: Treatment general managers will have higher scores on providing technical agricultural chemicals information index than will control general managers. The probability for the set of cell frequencies recorded in Table 31 on page 191 with the marginal totals remaining the same is .4351. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 23: Treatment general managers will increase their scores on fertilizer information qualification index to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 32 on page 192 with the marginal totals remaining the same is .0350. At the .05 level, this is a significant value. These data do support the original proposition. Given the marginal totals, this is the most extreme distribution which is in favor of treatment general managers.

E. H. 24: Treatment general managers will increase their scores on chemical information qualification index to a greater extent than will control general managers. The sum of the probability for the set of cell frequencies for 1963 recorded in Table 33 on page 193 and all other possible sets of cell frequencies which are more extreme, in favor of the treatment general managers, with the marginal totals remaining the same is .1795. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 25: Treatment general managers will have higher scores on perceived qualification to provide fertilizer information index than will control general managers. The probability for the set of cell frequencies recorded in Table 34 on page 194 with marginal totals remaining the same is .5128. At the .05 level, this is not a significant value. These data do not support the original proposition. Eleven of the 13 general managers increased their scores.

E. H. 26: Treatment general managers will have higher scores on perceived qualification to provide chemical information index than will control general managers. The probability for the set of cell frequencies recorded in Table 35 on page 194 with the marginal totals remaining the same is .4079. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 27: Treatment general managers will increase their scores on the progressivism scale to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 36 on page 195 with the marginal totals remaining the same is .4079. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 28: Treatment general managers will have higher scores on orientation to economic principles index than will control general managers. The sum of the probabilities for the set of cell frequencies recorded in Table 37 on page 196 and all other possible sets of cell frequencies which are more extreme, in favor of the treatment general managers, with the marginal totals remaining the same is .0318. At the .05 level, this is a significant value. These data do support the original proposition.

General Hypothesis 3: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their operational management performance than will similar general managers not participating in the same training program.

Supporting Hypothesis 8: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their operational management planning performance than will similar general managers not participating in the same training program.

E. H. 29: Treatment general managers will have higher fertilizer trend scores than will control general managers. The probability for the set of cell frequencies recorded in Table 38 on page 199 with the marginal totals remaining the same is .3916. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 30: Treatment general managers will have higher decision making scores than will control general managers. The probability for the set of cell frequencies recorded in Table 39 on page 201 with the marginal totals remaining the same is .4079. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 31: Treatment general managers will have higher implementation scores than will control general managers. The calculated $\underline{t}$ value for the transformed data is +0.51 which is not significant at the .05 level. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 40 on page 202.

E. H. 32: Treatment general managers will have higher evaluation scores than will control general managers. The calculated $\underline{t}$ value for the transformed data is +1.28 which is not significant at the .05 level. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 41 on page 202.

E. H. 33: Treatment general managers will have higher planned approach to customer scores than will control general managers. The probability for the set of cell frequencies recorded in Table 42 on page 203 with the marginal totals remaining the same is .43512. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 34: Treatment general managers will have higher advertising planning scores than will control general managers. The calculated t value for the transformed data is +.43 which is not significant at the .05 level. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 43 on page 204.

E. H. 35: Treatment general managers will have higher allocation of advertising funds scores than will control general managers. The calculated t value for the transformed data is +1.60 which is not significant at the .05 level. These data do not support the original proposition. The data used to test this hypothesis are reported in Table 44 on page 205.

Supporting Hypothesis 9: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their employee management performance than will similar general managers not participating in the same training program.

E. H. 36: Treatment general managers will increase their employee training scores to a greater extent than will control dealers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value for the transformed data recorded in Table 83 is 1.56 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 45 on page 206.

Table 83. Employee training score--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.0296	.36
Error	11	.0821	
Adjusted treatment	1	.1219	1.56
Adjusted error	10	.0781	

E. H. 37: Treatment general managers will have higher employee responsibility scores than will control general managers. The calculated t value for the transformed data is +0.14 which is not significant at the .05 level. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 46 on page 207.

Supporting Hypothesis 10: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their procurement management performance than will similar general managers not participating in the same training program.

E. H. 38: Treatment general managers will increase their selection of supplier scores to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 47 on page 208 with the marginal totals remaining the same is .4895. At the .05 level, this is not a significant value. These data do not support the original proposition.

E. H. 39: Treatment general managers will have higher present use of salesman scores than will control general managers. The calculated t value for the transformed data is +.52 which is not significant at the .05 level. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 48 on page 209.

Supporting Hypothesis 11: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their inventory management performance than will similar general managers not participating in the same training program.

E. H. 40: Treatment general managers will have higher inventory management scores than will control general managers. The sum of the probabilities for the set of cell frequencies recorded in Table 49 on page 210 and all other possible sets of cell frequencies which are more extreme, in favor of the treatment general managers with the marginal totals remaining the same is .2494. At the .05 level, this is not a significant value. These data do not support the original proposition.

Supporting Hypothesis 12: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their retail credit management performance than will similar general managers not participating in the same training program.

E. H. 41: Treatment general managers will increase their credit management scores to a greater extent than will control dealers. The F test based on the adjusted treatment and adjusted error mean squares for the transformed data was used to test the above hypothesis. The computed F value recorded in Table 84 is .31 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 50 on page 211.

Table 84. Credit management score--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.2456	1.89
Error	11	.1299	
Adjusted treatment	1	.0433	.31
Adjusted error	10	.1385	

Supporting Hypothesis 13: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their sales management performance than will similar general managers not participating in the same training program.

E. H. 42: Treatment general managers will have higher soil testing services (change) scores than will control general managers. The F test based on the treatment and error (a) mean squares was used to test the above hypothesis. The computed F value recorded in Table 85 is .09 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 51 on page 213.

Table 85. Soil testing services--analysis of variance

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	3.02	.09
Error (a)	11	34.24	
Years	1	10.40	1.32
Years X treatment	1	.55	.07
Error (b)	11	7.87	
Total	25		

E. H. 43: Treatment general managers will have higher soil testing intensity scores than will control general managers. The calculated t value is +0.87 which is not significant at the .05 level. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 52 on page 214.

E. H. 44: Treatment general managers will have higher educational activity (change) scores than will control general managers.

Table 86. Educational activities--analysis of variance

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	15.26	.57
Error (a)	11	26.76	
Years	1	2.60	.23
Years X treatment	1	.14	.01
Error (b)	11	11.31	
Total	25		

The F test based on the treatment and error (a) mean squares was used to test the above hypothesis. The computed F value recorded in Table 86 is 0.57 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 53 on page 215.

E. H. 45: Treatment general managers will have higher fertilizer program intensity scores than will control general managers. The mean for the control general managers was larger than the mean for the treatment general managers. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 54 on page 216. The calculated _t_ value is -0.35. If a non-directional hypothesis had been stated, this value would still not have been significant.

E. H. 46: Treatment general managers will have higher advertising activity (change) scores than will control general managers. The F test based on the treatment and error (a) mean squares was used to test the above hypothesis. The computed F value recorded in Table 87 is 0.61 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 55 on page 217.

Table 87. Advertising and promotion activities--analysis of variance

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	7.27	.61
Error (a)	11	11.94	
Years	1	5.70	1.08
Years X treatment	1	4.32	.82
Error (b)	11	5.25	
Total	25		

E. H. 47: Treatment general managers will have higher discount practices (change) scores than will control general managers. The F test based on the treatment and error (a) mean squares was used to test the above hypothesis. The computed _F_ value recorded in Table 88 is 0.52 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 56 on page 218.

Table 88. Discount practices--analysis of variance

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	8.50	.52
Error (a)	11	16.21	
Years	1	7.11	2.96
Years X treatment	1	10.80	4.50
Error (b)	11	2.40	
Total	25		

E. H. 48: Treatment general managers will have higher direct selling activity (change) scores than will control general managers. The F test based on the treatment and error (a) mean squares was used to test the above hypothesis. The computed F value recorded in Table 89 is 0.03 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 57 on page 220.

Table 89. Direct selling activities--analysis of variance

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.43	.03
Error (a)	11	16.82	
Years	1	.25	.03
Years X treatment	1	29.78	3.16
Error (b)	11	9.42	
Total	25		

General Hypothesis 4: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in 1) the function of advising strategic (over-all) management, 2) the internal environment of the firm, and 3) the activities of the firm than will similar general managers not participating in the same training program.

Supporting Hypothesis 14: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the function of advising strategic (over-all) management than will similar general managers not participating in the same training program.

E. H. 49: Treatment general managers will have higher equipment policy scores than will control general managers. The calculated t value for the transformed data is +1.46 which is not significant at the .05 level. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 58 on page 222.

E. H. 50: Treatment general managers will have higher efficiency ratio scores than will control general managers. The calculated t value for the transformed data is 1.81 which is significant at the .05 level. These data do support the original proposition. The data used to test this hypothesis were reported in Table 59 on page 223.

E. H. 51: Treatment general managers will increase their merchandising determination scores to a greater extent than will control general managers. The control general managers increased their scores more than the treatment general managers. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 60 on page 224. The value for F test based on the adjusted treatment and adjusted error mean squares for the transformed data (recorded in Table 90) is .002. The control general managers started with a lower margin determination score than treatment general managers and increased their score. The treatment general managers decreased their score. If the hypothesis had not been stated directional, this F value would not have been significant at the .05 level for a non-directional test.

Table 90. Merchandising determination--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.014	.04
Error	11	.320	
Adjusted treatment	1	.001	.002
Adjusted error	10	.351	

E. H. 52: Treatment general managers will have higher product determination scores than will control general managers. The probability for the set of cell frequencies recorded in Table 61 on page 225 with the marginal totals remaining the same is .0979. At the .05 level, this is not a significant value. These data do not support the original proposition. Although not significant at .05 level, given the marginal totals, this is the most extreme set of cell frequencies in favor of the treatment general managers.

E. H. 53: Treatment general managers will have higher capital determination scores than will control general managers. The probability for the set of cell frequencies recorded in Table 62 on page 226 with the marginal totals remaining the same is .0979. At the .05 level, this is not a significant value. These data do not support the original proposition. Although not significant at .05 level, given the marginal totals, this is the most extreme set of cell frequencies in favor of the treatment general managers.

Supporting Hypothesis 15: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the goals for their fertilizer and agricultural chemicals departments than will similar general managers not participating in the same training program.

E. H. 54: Treatment general managers will increase their fertilizer competition scores to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 63 on page 228 with the marginal totals remaining the same is .5128. At the .05 level, this is not a significant value. These data do not support the original proposition. Eleven of the 13 general managers increased their score on this measure.

E. H. 55: Treatment general managers will increase their expansion plan scores to a greater extent than will control general managers. The probability for the set of cell frequencies for 1963 recorded in Table 64 on page 229 with the marginal totals remaining the same is .1958. At the .05 level, this is not a significant value. These data do not support the original proposition. Although not significant at .05 level, given the marginal totals, this is the most extreme set of cell frequencies in favor of treatment general managers. Only 3 of the 13 general managers increased their expansion plan score.

E. H. 56: Treatment general managers will increase their agricultural chemical competition scores to a greater extent than will control general managers. The set of cell frequencies for 1963 recorded in Table 65 on page 230 is in favor of the control general managers. These data do not support the original proposition. The probability of that set of cell frequencies with the marginal totals remaining the same is .0979. Although not significant at .05 level, given the marginal totals, this is the most extreme set of cell frequencies in favor of control general managers.

Supporting Hypothesis 16: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in fertilizer application services than will similar general managers not participating in the same training program.

E. H. 57: Treatment general managers will have higher fertilizer application services (change) scores than will control general managers. The F test based on the treatment and error (a) mean squares was used to test the above hypothesis. The computed F value recorded in Table 91 is 0.34 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 66 on page 232. The control general managers had a higher average 1961 + 1963 score and the treatment general managers had a higher score for 1963. The F value for years is significant.

Supporting Hypothesis 17: General managers participating in an adequately conducted training program will have greater changes (direction

Table 91. Fertilizer application service--analysis of variance

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	3.23	.34
Error (a)	11	9.56	
Years	1	71.13	6.05
Years X treatment	1	15.76	1.34
Error (b)	11	11.76	
Total	25		

predicted) in their business firm facilities than will similar general managers not participating in the same training program.

E. H. 58: Treatment general managers will increase their total fixed assets to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value for transformed data (recorded in Table 92) is 1.29 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 67 on page 233.

Table 92. Total fixed assets--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.21393	.77
Error (a)	13	.27684	
Years	1	.00004	.05
Years X treatment	1	.00003	.03
Error (b)	13	.00088	
Total	29		
Adjusted treatment	1	.20334	1.29
Adjusted error (a)	12	.15754	

E. H. 59: Treatment general managers will increase their fertilizer fixed assets to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value for transformed data recorded in Table 93 is 0.83 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 68 on page 234.

Table 93. Fixed fertilizer assets--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.4444	.92
Error (a)	13	.4843	
Years	1	.0062	.57
Years X treatment	1	.0362	3.35
Error (b)	13	.0108	
Total	29		
Adjusted treatment	1	.0234	.83
Adjusted error (a)	12	.0281	

General Hypothesis 5: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the economic returns to the entire business operations than will similar general managers not participating in the same training program.

E. H. 60: Treatment general managers will increase their total net commodity sales to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value for the transformed data recorded in Table 94 is 0.01 which is not statistically significant. These data do not support the original

Table 94. Total net commodity sales--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.2471	.85
Error (a)	13	.2914	
Years	1	.0067	.11
Years X treatment	1	.0001	--
Error (b)	13	.0593	
Total	29		
Adjusted treatment	1	.0013	.01
Adjusted error (a)	12	.1211	

proposition. The data used to test this hypothesis were reported in Table 69 on page 237.

E. H. 61: Treatment general managers will increase their total gross commodity margins to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error means squares was used to test the above hypothesis. The computed F value recorded in Table 95 is .83 which is not statistically significant. These

Table 95. Total gross commodity margins--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	229,674,700	1.71
Error (a)	13	134,473,997	
Years	1	108,500	.09
Years X treatment	1	644,800	.52
Error (b)	13	1,242,069	
Total	29		
Adjusted treatment	1	5,029,500	.83
Adjusted error (a)	12	6,059,100	

data do not support the original proposition. The data used to test this hypothesis were reported in Table 70 on page 238.

E. H. 62: Treatment general managers will increase total net operating revenue to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value for transformed data recorded in Table 96 is 0.04 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 71 on page 239.

Table 96. Total net operating revenue--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.50146	1.76
Error (a)	13	.28418	
Years	1	.00090	.25
Years X treatment	1	.00006	.02
Error (b)	13	.00362	
Total	29		
Adjusted treatment	1	.00075	.04
Adjusted error (a)	12	.01924	

E. H. 63: Treatment general managers will increase their ratio of total net operating profits to total tangible operating assets to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value recorded in Table 97 is 0.60 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 72 on page 240.

Table 97. Ratio of total net operating profits to total tangible operating assets--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.00115	.11
Error (a)	13	.01015	
Years	1	.00050	.40
Years X treatment	1	.00045	.36
Error (b)	13	.00124	
Total	29		
Adjusted treatment	1	.00259	.60
Adjusted error (a)	12	.00431	

E. H. 64: Treatment general managers will increase their ratio of total net operating profits to total fixed assets to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. As recorded in Table 98, the computed F value is 0.73 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 73 on page 241.

Table 98. Ratio of total net operating profits to total fixed assets--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.00613	.096
Error (a)	13	.06416	
Years	1	.00001	.002
Years X treatment	1	.00536	.957
Error (b)	13	.00560	
Total	29		
Adjusted treatment	1	.03527	.734
Adjusted error (a)	12	.04803	

E. H. 65: Treatment general managers will increase their ratio of total gross commodity margins to total net commodity sales to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value recorded in Table 99 is 0.89 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 74 on page 242.

Table 99. Ratio of total gross commodity margins to total net commodity sales--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.00040	.10
Error (a)	13	.00387	
Years	1	.00004	.36
Years X treatment	1	.00049	4.45
Error (b)	13	.00011	
Total	29		
Adjusted treatment	1	.00017	.89
Adjusted error (a)	12	.00019	

E. H. 66: Treatment general managers will increase their ratio of total net operating revenue to total net commodity sales to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed _F_ value recorded in Table 100 is 0.004 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 75 on page 243.

E. H. 67: Treatment general managers will increase their ratio of total net operating profits to total net commodity sales to a greater extent than will control general managers. The F test

Table 100. Ratio of total net operating revenue to total net commodity sales--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.001446	.396
Error (a)	13	.003653	
Years	1	.001100	3.073
Years X treatment	1	.000022	.061
Error (b)	13	.000358	
Total	29		
Adjusted treatment	1	.000003	.004
Adjusted error (a)	12	.000750	

based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value recorded in Table 101 is 0.20 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 76 on page 244.

Table 101. Ratio of total net operating profits to total net commodity sales--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.00189	.51
Error (a)	13	.00372	
Years	1	.00029	1.00
Years X treatment	1	.00003	.10
Error (b)	13	.00029	
Total	29		
Adjusted treatment	1	.00009	.20
Adjusted error (a)	12	.00045	

E. H. 68: Treatment general managers will decrease their ratio of total production expense to total net commodity sales to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value recorded in Table 102 is 0.06 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 77 on page 245.

Table 102. Ratio of total production expense to total net commodity sales--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.000030	.008
Error (a)	13	.003803	
Years	1	.000263	3.247
Years X treatment	1	.000001	.012
Error (b)	13	.000081	
Total	29		
Adjusted treatment	1	.000043	.06
Adjusted error (a)	12	.000753	

General Hypothesis 6: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the economic returns to the fertilizer department than will similar general managers not participating in the same training program.

E. H. 69: Treatment general managers will increase their fertilizer net sales to a greater extent than will control dealers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value for transformed data recorded in Table 103 is 0.33 which is not statistically significant. These data do not

Table 103. Fertilizer net sales--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.0280	.11
Error (a)	13	.2535	
Years	1	.0449	17.27
Years X treatment	1	.0002	.08
Error (b)	13	.0026	
Total	29		
Adjusted treatment	1	.0172	.33
Adjusted error (a)	12	.0526	

support the original proposition. The data used to test this hypothesis were reported in Table 78 on page 246.

E. H. 70: Treatment general managers will increase their tons of fertilizer sold to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed _F_ value for the transformed data recorded in Table 104 is 0.15 which is not statistically

Table 104. Tons of fertilizer sold--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.0551005	.23
Error (a)	13	.2434241	
Years	1	.0258603	3.96
Years X treatment	1	.0000002	.00
Error (b)	13	.0065386	
Total	29		
Adjusted treatment	1	.0065722	.15
Adjusted error (a)	12	.0437194	

significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 79 on page 247.

E. H. 71: Treatment general managers will increase their fertilizer net revenue to a greater extent than will control general managers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value recorded in Table 105 is 0.80 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 80 on page 248.

Table 105. Fertilizer net operating revenue--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	5,283,500	.008
Error (a)	13	639,960,846	
Years	1	51,700,700	4.321
Years X treatment	1	22,770,500	1.903
Error (b)	13	11,963,523	
Total	29		
Adjusted treatment	1	75,946,600	.804
Adjusted error	12	94,426,475	

E. H. 72: Treatment general managers will increase their ratio of fertilizer net profits to fertilizer fixed assets to a greater extent than will control dealers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value recorded in Table 106 is 0.69 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis are reported in Table 81 on page 249.

Table 106. Ratio of fertilizer net profits to fertilizer fixed assets--analysis of variance and covariance of data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.2620	1.08
Error (a)	13	.2431	
Years	1	.0412	2.18
Years X treatment	1	.0257	1.36
Error (b)	13	.0189	
Total	29		
Adjusted treatment	1	.0344	.69
Adjusted error (a)	12	.0501	

General Hypothesis 7: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in agricultural chemicals sales than will similar general managers not participating in the same training program.

E. H. 73: Treatment general managers will increase their agricultural chemicals net sales to a greater extent than will control dealers. The F test based on the adjusted treatment and adjusted error mean squares was used to test the above hypothesis. The computed F value for the transformed data recorded in Table 107 is 0.15 which is not statistically significant. These data do not support the original proposition. The data used to test this hypothesis were reported in Table 82 on page 250.

Table 107. Agricultural chemical sales--analysis of variance and covariance of transformed data

Source of variation	Degrees of freedom	Mean square	F
After (1963)			
Treatment	1	.0344	.15
Error (a)	13	.2221	
Years	1	.0015	.14
Years X treatment	1	.0022	.20
Error (b)	13	.0110	
Total	29		
Adjusted treatment	1	.0075	.15
Adjusted error (a)	12	.0499	

Discussion and Summary of Findings

A summary discussion of the findings will be presented in this section. Some additional comments about various measures will also be made.

Only 5 of the 73 empirical hypotheses which compared the treatment and control general managers were given statistical support at the .05 level and only 6 additional empirical hypotheses were supported at the .10 level. If non-directional hypotheses had been stated, two of the empirical hypotheses for which the scores on the measures were in favor of the control general managers would have been statistically significant at either the .05 or .10 level of probability for a non-directional test.

Because the research project was exploratory in nature and the sample size small, some descriptive statistics and discussion regarding findings will be included in this section. Some of the discussion will center on the sets of cell frequencies and on the calculated means to determine if any trend exists, even though this trend is not statistically significant according to the tests used in the analysis of the data. One of the reasons for including the tables in the methodology chapter was to allow the reader to observe the distributions and means for the measures.

As previously pointed out, the statistical analysis had certain limitations. However, the statistical analysis used did provide a systematic and unbiased method of analyzing the observed data. In examining the results of the statistical tests, the limitations should be kept in mind. However, it is sometimes desirable to make inferences beyond the statistical tests. Ultimately, each individual may set his own criteria of what is of practical significance.

Two additional types of measures for which no statistical tests were made are included in this discussion. One of these categories of change is the general manager's perception of the change that had taken place during the training period. Several questions were worded in such a way that the general managers could indicate on a "continuum" the degree of change which they perceived had taken place in themselves and in the business firm during the training period. These questions were asked of both the treatment and control general managers. The responses to these questions are reported in the tables included in Appendix A, p. 335. For each of the questions, the treatment general managers were asked to indicate their perception of the effect, if any, of the training program on the changes made. These responses are reported in Appendix B, p. 345. Also, the treatment general managers were asked to agree or disagree to certain statements about the training program. These responses are reported in Appendix C, p. 355. Statements about trends based on sets of cell frequencies or means which were not statistically significant must be viewed with caution because it may be only random deviation. On the other hand, the limitations of the statistical analysis may have prevented the detection of differences. The reference to limitations here is mainly in regard to sample size. Statements involving percentages from the appendix tables should be viewed with caution because no statistical tests of significance were made using these data. However, in spite of these limitations, some additional insights may be gained about the influence of the training program by the use of the procedures mentioned above.

Some of the possible explanations of why the general hypotheses were not given statistical support are presented under each general hypothesis. Also, some reasons are given why some of the measures used may not have differentiated between the two groups of general managers. In addition, some possible reasons why the changes which were predicted to occur from the training program did not occur are discussed under each general hypothesis.

Knowledge

Eleven empirical hypotheses relate to General Hypothesis 1: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge of those content areas included in the training program than will similar general managers not participating in the same training program. Four supporting hypotheses specifying the areas of knowledge relate to this general hypothesis.

Two of the 11 empirical hypotheses were given statistical support at the .05 level of probability and 1 was supported at the .10 level. The sets of cell frequencies for five of the measures were in favor of the treatment general managers. Two sets of cell frequencies were not in favor of either group of managers given the unequal sample size. One set of cell frequencies was in favor of the control general managers.

The empirical hypotheses which were given statistical support included the following dependent measures: fertilizer program scores (.05 level), present value of money score (.05 level) and limiting factors score (.10 level). Approximately 88 percent of the treatment general managers had fertilizer program scores of 4 and over compared to 20 percent of the control general managers (Table 12, p. 166). Approximately 62 percent of the treatment general managers had present value of money scores of 2 and over compared to none of the control general managers (Table 20, p. 178). Seventy-five percent of the treatment managers had limiting factors scores of 9 and over compared to 20 percent of the control general managers (Table 17, p. 174).

The measures for which the sets of cell frequencies were in favor of the treatment general managers included: fertilizer principles knowledge scale (50 percent of treatment general managers increased their scores compared to 20 percent of control general managers, Table 10, p. 163); demonstration purpose score (50 percent of treatment general managers had scores of 3 and over compared to 20 percent of control general managers, Table 11, p. 165); chemical principles knowledge scale (50 percent of the treatment general managers increased their scores compared to 20 percent of control general managers, Table 13, p. 168); farmers' expectations of agricultural chemicals dealer score (25 percent of treatment general managers increased their scores compared to none of control general managers, Table 15, p. 171); and, number of management functions identified (approximately 88 percent of treatment general managers identified 3 or more functions compared to 40 percent of control general managers, Table 17, p. 174).

Given the unequal group size and some chance deviation, the two measures for which the sets of cell frequencies were not in favor of either group of managers were: farmers' expectations of fertilizer dealer score (seventy-five percent of treatment general managers increased their score compared to 80 percent of control general managers, (Table 14, p. 169); and, margin determination score (50 percent of the treatment general managers had scores of 4 or more compared to 60 percent of control general managers, Table 19, p. 177).

The measure for which the set of cell frequencies was in favor of the control general managers was potential fertilizer use score. Eighty percent of the control general managers selected the "correct" answer compared to approximately 38 percent of treatment general managers.

An examination of Tables 111 to 113 (pp. 337-339) in Appendix A reveals that, for 10 of the 11 items related to various areas of knowledge, a higher percentage of the treatment general managers indicated a "much" or a "very much" increase in understanding of those areas than the control general managers. These areas included: 1) understanding of the potential for fertilizer--87.5% (treatment) to 40% (control), 2) understanding of the fertilizer industry--87.5% to 80.0%, 3) understanding of product trends for fertilizer--62.5% to 00.0%, 4) understanding of the procedures for conducting demonstrations--50.0% to 00.0%, 5) understanding of merchandising, promotional and advertising alternatives for your business--50.0% to 20.0%, 6) understanding of product trends for agricultural chemicals--25.0% to 00.0%, 7) understanding of your role with your farmer customers--50.0% to 20.0%, 8) understanding of what farmers expect of you as a fertilizer dealer--75.0% to 20.0%, 9) understanding of the economic and social situation of your farmer customers--50.0% to 20.0%, and 10) understanding about what should go into planning fertilizer programs for farmers--75.0% to 20.0%. For the area of understanding of plant and facility alternatives available for your fertilizer department, 80.0% of the control general managers indicate "much" or "very much" compared to 62.5% of the treatment general managers.

An examination of Tables 119 to 121 (pp. 347-349) in Appendix B reveals that for 9 of the 11 items, 75 percent or more of the treatment general managers rated the influence of the training program as "some," "much" or "great." For 7 of the 11 items, 50 percent or more of the treatment general managers rated the influence of the training program as "much" or "great." These items were: 1) understanding of the potential for fertilizer--87.5% (much or great), 2) understanding of fertilizer industry--62.5%, 3) understanding of product trends for fertilizer--50.0%, 4) understanding of procedures for conducting demonstrations--62.5%, 5) understanding of role with farmer customers--50.0%, 6) understanding of what farmers expect of a fertilizer dealer--87.5%, and 7) understanding about what should go into planning fertilizer programs for farmers--62.5%.

Only 3 of the 11 empirical hypotheses were given statistical support at either the .05 or .10 level. There are several possible explanations for this lack of support of General Hypothesis 1.

A reason for the lack of support of this general hypothesis may be found in the lack of precise measuring instruments in some cases and some of the measures being bounded. The fertilizer knowledge scale can be criticized for not allowing enough difference in possible scores and for being bounded by an upper limit. This measure could be expanded for future use both by increasing the number of questions asked and by making them more difficult. Farmers' expectations of fertilizer dealer score and farmers' expectations of agricultural chemicals dealer score could also be criticized for being bounded by an upper limit. Five of the treatment general managers and six of the control general managers selected the top scored response to the questions about farmers' expectations before the training period. Because the responses to the questions regarding farmers' expectations might reflect a change in the general managers' frame of reference between the first and last time they were asked these questions, the scores were adjusted by the procedure outlined in the method and procedure section of the methodology chapter. Although an attempt was made to make these measures more precise, it may not have been sufficient with the number of general managers selecting the top scored response before the training program. Also, some of the measures used for knowledge were obtained only after the training period which did not allow the opportunity to determine the beginning level on the measure.

The second reason for the lack of support may be the sample size and related problems. Because this area has been discussed in the methodology chapter and in this chapter, no additional elaboration will be made here.

A third reason for the lack of support may be that a large area of training is being measured with only a few empirical measures. In some instances, the results of training which took up to two days to present are being measured with only one or two questions. Some subject matter areas were not included in the questions asked. This probably does not do justice to the subject matter area covered nor to the specialist who taught that area. However, due to the wide range of subject matter and the large amount of material presented, there was judged to be no alternative but to limit the number of questions because of the time required to interview the dealers.

A fourth possible explanation may be that there was no difference in change between the two groups of general managers even though the treatment general managers participated in the training program. During the training period all (including control) of the general managers attended some sort of training sessions and meetings. There was probably some overlap between subject matter presented at these meetings and some of the presentations made in the training program. Even though it is assumed that these other sources of information were randomly distributed over both the treatment and control general managers it is possible that some of the same, or similar material, was presented to all general managers. In addition to training sessions and meetings, other sources of information including books, pamphlets, bulletins, etc. pertaining to some of the areas taught in the training program were also available to all the general managers. A second point about no difference in change concerns the training program per se. It is possible that what was taught in the training program was not relevant to all of the general managers who participated in the training program. However, this appears rather unlikely based on the discussion earlier in the thesis on how subject matter areas were selected. On the other hand some of the attitude and learning principles, as stated in the theoretical orientations chapter, may not have been relevant or some may have been omitted. Or, perhaps, the information was not transferred effectively due to the content, content level and the manner in which the training program was conducted.

A fifth possible explanation may be the influence of the intensive interviewing on the general managers. Because the interviewing was intensive, there was, no doubt, some effect of the interviewing on future action taken by the control general managers as well as the treatment general managers. It was assumed that the influence of the interviews was similar for both treatment and control groups. The interviewing may have had a differential influence. Even though the influence was the same for both groups, the measures may not have been precise enough to distinguish interviewing influence from training program influence. This is particularly true of those measures bounded by an upper limit and/or the scale of measurement being ordinal.

Although the first general hypothesis was not given support by the statistical testing of the related empirical hypotheses, there appears to be a trend in favor of the treatment general managers. Also, in general, the treatment general managers did perceive that they had increased their understanding in these areas and that the training program did have an influence in increasing their understanding.

Attitudes

Seventeen empirical hypotheses relate to General Hypothesis 2: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes related to those content areas included in the training program than will similar general managers not participating in the same training program. Three supporting hypotheses specifying the areas for attitude change relate to this general hypothesis.

Two of the 17 empirical hypotheses were given statistical support at the .05 level of probability and one was supported at the .10 level. The sets of cell frequencies for two of the measures were in favor of the treatment general managers. The sets of cell frequencies (probabilities from .39 to .52) for nine of the measures were not in favor of either group of general managers given the unequal group size and some chance deviation. For one measure, 12 of the 13 managers were at the upper limit which also gave no indication of trend in favor of either group. The means for two of the measures were in favor of control general managers. If the hypotheses had not been stated directional, these would have been given statistical support at the .05 and .10 level for a non-directional test.

The empirical hypotheses which were given statistical support included the following dependent measures: fertilizer information qualification index (.05 level) (100 percent of treatment general managers increased their scores compared to 40 percent of control general managers, Table 32, p. 192); orientation to economic principles index (approximately 88 percent of treatment general managers had scores of 2 and over compared to 20 percent of control general managers, Table 37, p. 196); and perceived importance of fertilizer department index (50 percent of treatment general managers increased their scores compared to none of the control general managers, Table 21, p. 180).

The two measures for which the tests of cell frequencies were in favor of the treatment general managers were: perceived importance of agricultural chemicals department index, and chemical information qualification index. Approximately 38 percent of treatment general managers increased their scores on perceived importance of agricultural chemicals department index compared to none of the control general managers (Table 24, p. 183). Approximately sixty-three percent of treatment general managers increased their scores on chemical information qualification index compared to 20 percent of control general managers (Table 33, p. 193).

The nine measures for which the sets of frequencies were not in favor of either group included: general attitudes toward fertilizer index (50 percent of treatment general managers increased their scores compared to 40 percent of the control general managers, Table 22, p. 181); perceived importance of planning farmer fertilizer programs to business success index (62.5 percent of treatment general managers had the score of 3 compared to 60 percent of the control general managers, Table 23, p. 182); providing technical fertilizer information index (62.5 percent of treatment general managers had the score of 4 compared to 80 percent of the control general managers, Table 27, p. 187); perceived importance of planning farmer fertilizer program index (62.5 percent of treatment general managers had the score of 3 compared to 80 percent of the control general managers, Table 28, p. 187); agricultural chemicals dealers responsibility index (62.5 percent of treatment general managers had the score of 3 compared to 80 percent of the control general managers, Table 30, p. 190); providing agricultural chemical technical information index (62.5 percent of the treatment general managers had the score of 4 compared to 60 percent of the control general managers, Table 31, p. 191); perceived qualification to provide fertilizer information index (87.5 percent of treatment general managers increased their scores compared to 80 percent of control general managers, Table 34, p. 194); perceived qualification to provide agricultural chemicals information (50 percent of treatment general managers increased their scores compared to 60 percent of the control general managers, Table 35, p. 194); and progressivism scale (50 percent of treatment general managers increased their scores compared to 40 percent of control general managers, Table 36, p. 195). The one measure which 12 of the 13 managers were at the upper limit was fertilizer dealer responsibility index (100 percent of treatment general managers had the score of 3 compared to 80 percent of the control general managers, Table 26, p. 186).

If the hypotheses had not been stated directional, two measures which were in favor of the control general managers would have been statistically significant for a non-directional test. These two measures are: opinion leadership (fertilizer) index (.10 level) and opinion leadership (agricultural chemicals) index (.05 level). For the opinion leadership decreased from 14.38 in 1961 to 13.50 in 1963, whereas the mean for the control general managers increased from 11.80 in 1961 to 13.20 in 1963 (Table 25, p. 185). For the opinion leadership (agricultural chemicals) index, the mean for the treatment general managers decreased from 12.88 in 1961 to 11.88 in 1963, whereas the mean for the control general managers increased from 12.80 in 1961 to 14.60 in 1963 (Table 29, p. 189).

Considering the trend toward increased knowledge in favor of the treatment dealers and their perception of increased competence to give fertilizer advice, the question may be raised as to whether these changes (decreases for treatment dealers) may not be due to changes in reference.

An examination of Tables 114 and 115, pp. 340-341, in Appendix A, reveals that for all eight items relating to selected areas for attitude change, a higher percentage of treatment managers indicated a "much" or a "very much" change than the control general managers. These areas included: 1) increased confidence in selling fertilizer--87.5% (treatment) to 00.0% (control); 2) increased ideas about importance of fertilizer use for farmers--87.5% to 40.0%; 3) increased confidence in making recommendations on fertilizer to farmers--100.0% to 60.0%; 4) increased confidence in making recommendations on agricultural chemicals to farmers--50.0% to 40.0%; 5) increased ideas about the importance of agricultural chemicals use for farmers--62.5% to 40.0%; 6) increased confidence in making major decision--75.0% to 20.0%; 7) increased confidence in managerial ability--50.0% to 20.0%, however two treatment managers indicated no change; and 8) increased confidence in attempting to influence attitudes and understanding of farmers--75.0% to 60.0%.

An examination of Tables 122 and 123, p. 350-351,in Appendix B reveals that for six of the eight items 50.0 percent or more of the treatment general managers rated the influence of the training program as "much" or "great." These items were: 1) increased confidence in selling fertilizer--75.0%, 2) increased ideas about importance of fertilizer use for farmers--100.0%, 3) increased confidence in making recommendations on fertilizer to farmers--100.0%, 4) confidence in making recommendations on agricultural chemicals to farmers--50.0%, 5) increased ideas about importance of agricultural chemicals use for farmers--62.5%, and 6) confidence in attempting to influence attitudes and understanding of farmers--62.5%.

Only 3 of the 17 empirical hypotheses were given statistical support at either the .05 or .10 level. There are several possible explanations for this lack of support of General Hypothesis 2. The possible explanations included the five which were mentioned for the first general hypothesis: 1) lack of precise measuring instruments (in some cases) and some of the measures being bounded by an upper limit, 2) sample size and related problems, 3) large areas of training being measured by only a few empirical measures, 4) no difference in change between the two groups of general managers, and 5) interviewing influence. Two possible additional explanations include changes in frame of reference and it is probably easier to reinforce attitudes rather than convert attitudes.

Concerning lack of precision in measuring, there are some measures which should be mentioned. No supplemental questions were asked about perceived importance of the fertilizer department. Six general managers indicated the high scored response before the training period. Thus, only seven managers could increase on this measure. The same general comments are relevant for perceived importance of the agricultural chemicals department. In this case, only five general managers could increase. The question on fertilizer dealer responsibility was asked only after training and 12 of the 13 general managers selected the high scored response. On perceived qualification to provide fertilizer information (as compared to other product lines) index, 11 of the 13 general managers increased. A wider range of responses in the above cases may have helped to differentiate general managers.

One possible reason for the failure of the analysis of the data to show differential change between the two groups of general managers may be that the treatment general managers changed their frame of reference during the training period to a greater extent than did the control general managers. One way in which the general managers may have changed their frame of reference would be the use of higher and more rigid evaluation criteria for the evaluation of their managerial role and their business operations. The content of the training program, materials provided, and the method and personnel involved in its presentation may have caused the treatment general managers to be more critical in their replies to questions asked of them in the interviews conducted after the training program than in those conducted before it started. If the treatment general managers answered "after" questions with a higher frame of reference in the 1963 interviews it is very possible that changes that may have been made during the training period would not be shown in the analysis of data. From informal contacts with the general managers in the training program this is known to have occurred in several cases.

Another possible explanation may be that training programs may serve as more of an agent of reinforcement than of conversion in the area of attitudes. Because of the presently held attitudes of the individual, the social system to which he belongs, his reference groups and referents and relevant aspects of the situation, training programs may serve more as an agent of reinforcement. A congruent change has been defined as, "A change in the valence of an existing attitude in the direction of its original sign, . . ." (60, p. 269). On the other hand an incongruent attitude change is, "A change in the valence of an existing attitude in a direction opposite to its original sign . . ." (60, p. 269). In some cases, a congruent attitude change may also be more difficult to measure than incongruent attitude change.

The second general hypothesis was not given support by the statistical testing of the related empirical hypotheses and there appears to be only a slight trend. If there is a trend, it appears in favor of the treatment general managers. In general, the treatment general managers did tend to perceive that they had more change in certain areas than control general managers and perceived that the training program did have an influence in changing their attitudes.

Performance

Twenty empirical hypotheses relate to General Hypothesis 3: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their operational management performance than will similar general managers not participating in the same training program. Six supporting hypotheses specifying areas of operational management performance relate to this general hypothesis.

Only one of the 20 empirical hypotheses was given statistical support at either the .05 level or .10 level. The t-test for allocation of advertising funds was significant at the .10 level. The mean for the treatment general managers was -0.828 compared to -1.142 for the control general managers Table 44, p. 205. Only two other t or F values were over one and only one set of cell frequencies had a probability of less than .39. The trend for two of these three measures was in favor of the treatment general managers. The two measures were evaluation score (the mean for the treatment general managers was 0.275 compared to -0.001 for the control general managers Table 41, p. 202) and inventory management score (75.0 percent of treatment general managers had a score of 2 and over compared to 40 percent of control general managers Table 49, p. 210). The trend for employee training score was in favor of the control general managers. The treatment general managers had a mean score of 0.362 in 1961 and 0.100 in 1963. The control general managers had a mean score of 0.471 in 1961 and 0.199 in 1963 (Table 45, p. 206).

In a descriptive framework, the mean for the treatment general managers was larger than the mean for the control general managers on the following measures: implementation score (the mean for the treatment general managers was 0.043 compared to -0.090 for the control general managers, Table 40, p. 202); advertising planning score (the mean for the treatment general managers was -1.216 compared to -1.444 for the control general managers, Table 43, p. 204); employee responsibility (the mean for the treatment general managers was -0.513 compared to -0.609 for the control general managers, Table 46, p. 207); present use of salesman score (the mean for the treatment general managers was 0.615 compared to 0.511 for the control general managers, Table 48, p. 209); credit management score (the mean for the treatment general managers was 0.056 in 1961 and -0.1054 in 1963 compared to means of -0.079 in 1961 and -0.336 in 1963 for control general managers, Table 50, p. 211);

soil testing service change score (the average mean for the treatment general managers was 3.5 compared to 2.8 for the control general managers, Table 51, p. 213); soil testing intensity score (the mean for the treatment general managers was 8.38 compared to 4.80 for the control general managers, Table 52, p. 214); educational activity change score (the average mean for the treatment general managers was 1.37 compared to -0.20 for the control general managers, Table 53, p. 215); advertising activity change score (the average mean for the treatment general managers was 1.18 compared to 0.10 for the control general managers, Table 55, p. 217); discount practices change score (the average mean for the treatment general managers was -0.13 compared to -0.80 for the control general managers, Table 56, p. 218); and direct selling activity change score (the average mean for the treatment general managers was 1.25 compared to 1.00 for the control dealers, Table 57, p. 220). The reader is reminded that some of these differences were very small and this discussion is being presented in a descriptive framework because of the small sample size and exploratory nature of the project.

The sets of cell frequencies for the following measures did not show much trend either way: fertilizer trend scores (75 percent of the treatment general managers had scores of 2 and over compared to 60 percent of control general managers, Table 38, p. 199); decision-making scores (50 percent of the treatment general managers had scores of 6 and over compared to 40 percent of control general managers, Table 39, p. 201); planned approach to customer score (62.5 percent of the treatment general managers had scores of 4 and over compared to 60 percent of the control general managers, Table 42, p. 203); and selection of supplier score (25 percent of the treatment general managers increased their scores compared to 20 percent of the control general managers, Table 47, p. 208).

The mean for the control general managers on fertilizer program intensity score (282.80) was higher than the treatment general manager mean (262.50), Table 54, p. 216.

An examination of Tables 116 and 117, p. 342-343, in Appendix A reveals that, for six of the seven items relating to performance, a higher percentage of the treatment general managers indicated a "much" or a "very much" increase in performance than the control general managers. These areas included: 1) increased analysis of various alternatives for your business--12.5%

(treatment) to 00.0% (control); 2) increased effectiveness in making and carrying out decisions related to your business--50.0% to 20.0%; 3) increased analysis of fertilizer trade area in the areas of trend, competition, factors related to sales and use and potentials--50.0% to 20.0%, in determining prices and margins in reference; 4) improved communications with employees--37.5% to 00.0%; 5) increased ability to handle problems and questions from farmer customers related to fertilizer and agricultural chemicals--75.0% to 20.0%; 6) increased effectiveness in motivating and influencing farmer customers--25.0% to 00.0%.

An examination of Tables 124 and 125, pp. 352-353, in Appendix B reveals that for three of the seven items, 50 percent or more of the treatment general managers rated the influence of the training program as "much" or "great." These areas were: 1) increased effectiveness in making and carrying out decisions related to your business--50.0%; 2) increased analysis of fertilizer trade area in the areas of trend, competition, factors related to sales and use and potential --50.0%; 3) increased ability to handle problems and questions from farmer customers related to fertilizer and agricultural chemicals--87.5% and, 4) increased your effectiveness in motivating and influencing your farmer customers--50.0%.

Only one of the 20 empirical hypotheses was given statistical support at either the .05 or .10 level. There are several possible explanations for this lack of support of General Hypothesis 3. Most of the explanations for the first and second general hypotheses also apply to this hypothesis. An additional factor in this case may be the restrictions imposed by the physical and social environment in which the general manager works.

Concerning lack of precision in measuring, probably the two major factors in this case are 1) several measures were obtained only after the training program and 2) lack of detailed measures in areas of performance. More precision might have been gained if more of the measures had been obtained both before and after training. The judges in scoring many of the performance questions would have had a better basis for reaching decisions if more detailed information about the processes, methods and procedures used by the general managers had been obtained. Low scores for most of the general managers on some of the performance questions may be due to not obtaining detailed information from the managers rather than low performance in the area for the general managers of both groups. A more adequate measure of the intensity with which various services were provided may have made it possible to increase the differentiation between general managers.

Many of the variables of the social system (business firm) in which the general manager works may become relevant as the manager attempts to perform. These factors were discussed in detail in the theoretical orientations chapter. Certain restrictions imposed by over-all management, physical facilities, formal structure, informal structure, established communication systems, goals of the business firm, etc. may have hindered or prevented the general managers from making certain changes in the short time period between the training and the collection of the after data during 1963.

Although the third general hypothesis was not given support by the statistical testing of the related empirical hypotheses, there appears to be a slight trend in favor of the treatment general managers. Also, in general, the treatment general managers did perceive that their performance had increased in certain areas and perceived that the training program did have an influence in certain areas.

Internal environment and activities of the firm

Eleven empirical hypotheses relate to General Hypothesis 4: General managers participating in an adequately conducted training program will have greater changes (direction predicted) 1) in the function of advising strategic (over-all) management, 2) in the internal environment of the firm, and 3) in the activities of the firm than will similar general managers not participating in the same training program. Three supporting hypotheses related to the three areas mentioned above were stated.

One of the eleven empirical hypotheses was given statistical support at the .05 level of probability and three were supported at the .10 level. In three additional cases, the trend is in favor of the treatment general managers. The probability for one set of cell frequencies was .5128 and the F value for one measure was .002. One set of cell frequencies which was in favor of the control general managers had a probability of .0979. For one measure there was a significant interaction between years and treatment, thus the main effect must be examined with this in mind.

The empirical hypotheses which were given statistical support included the following dependent measures: efficiency ratio score (.05 level), equipment policy score (.10 level), product determination score (.10 level) and capital determination score (.10 level). For the efficiency ratio score the mean for the treatment general managers was -0.232 compared to -0.660 for the control general managers, Table 59, p. 223. For the equipment policy score the mean for the treatment general managers was 0.049 compared to -0.174 for the control general managers, Table 58, p. 222. Fifty percent of the treatment general managers had product line determination scores of 3 and over compared to none of the control general managers, Table 61, p. 225. Fifty percent of the treatment general managers had capital determination scores of 3 and over compared to none of the control general managers, Table 62, p. 226.

The measure for which the set of cell frequencies was in favor of the treatment general managers was expansion plan score (37.5 percent of the treatment general managers increased their scores compared to none of the control general managers, Table 64, p. 229).

Although the adjusted means were not significantly different, the treatment general managers increased their means for total fixed assets and fertilizer fixed assets more on a percentage basis than did the control general managers. For the treatment general managers the 1961 mean for total fixed assets was 104.5 percent of the 1960 mean as compared to 99.7 percent for the control general managers; the 1962 mean for total fixed assets was 102.2 percent of the 1960 mean as compared to 98.4 percent for the control general managers; and the average mean $\left(\frac{1961 + 1962}{2}\right)$ for total fixed assets was 103.3 percent of the 1960 mean as compared to 99.1 percent for the control general managers. For the treatment general managers the 1961 mean for fertilizer fixed assets was 118.3 percent of the 1960 mean as compared to 104.8 percent for the control general managers; the 1962 mean for fertilizer fixed assets was 124.6 percent of the 1960 mean as compared to 90.4 percent for the control general managers; and the average mean $\left(\frac{1961 + 1962}{2}\right)$ for fertilizer fixed assets was 121.5 percent of the 1960 mean as compared to 97.6 percent for the control general managers.

The set of cell frequencies for fertilizer competition scores was not in favor of either group (87.5 percent of the treatment general managers increased their scores compared to 80 percent of the control general managers, Table 63, p. 228). Although the adjusted means were not significantly different, the control general managers started with a lower mean merchandising determination score of -0.012 and increased their mean score to 0.238, whereas the treatment general managers decreased their mean score from 0.519 to 0.306, Table 60, p. 224.

The set of cell frequencies for agricultural chemical competition scores was in favor of the control general managers (probability = .0979). One hundred percent of the control general managers increased their scores compared to 50 percent of the treatment general managers (Table 65, p. 230). The years-treatment interaction for fertilizer application (change) score was significant. The mean for the treatment general managers increased from 0.88 in 1961 to 5.88 in 1963 compared to an increase of 3.20 in 1961 to 5.00 in 1963 for the control general managers (Table 66, p. 232).

Only four of the eleven empirical hypotheses were given statistical support at either the .05 or .10 level. There are several possible explanations for this lack of support of General Hypothesis 3. The possible explanations included most of those discussed in regard to the previous hypotheses.

Again the range of possible answers was limited for such measures as fertilizer competition score, expansion plan score and agricultural chemical competition score. Probably some supplemental questions should have been asked regarding expansion plans to determine if the general manager had changed his frame of reference. Because most of the explanations have been previously discussed, the reader is referred to the earlier discussion.

Although the fourth general hypothesis was not given support by the statistical testing of the related empirical hypotheses, there appears to be a slight trend in favor of the treatment general managers.

Outcomes for the firm from operational management

Three general hypotheses relate to economic returns from the business operation. Economic returns were divided into those returns to the entire (total) business, returns to the fertilizer department and returns to the agricultural chemicals department.

Economic returns to the total business Nine empirical hypotheses relate to the General Hypothesis 5: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the economic returns to the entire business operations than will similar general managers not participating in the same training program.

None of the nine empirical hypotheses were given statistical support at either the .05 level of probability or .10 level of probability. All of these tests were made on the adjust mean, i.e., adjusted for beginning differences. Analysis of covariance was used.

In order to determine if any trends exist, a descriptive approach will be used. The reader is cautioned that a significant difference was not detected by the statistical tests at the stated probability level. In a descriptive framework, the 1961 mean will be divided by the beginning (1960) mean to determine what percent the 1961 mean was of the beginning mean; the 1962 mean will be divided by the beginning (1960) mean to determine what percent the 1962 mean was of the beginning mean; and the average mean $\left(\frac{1961 + 1962}{2}\right)$ will be divided by the beginning (1960) mean to determine what percent the average mean was of the beginning mean.* The results of these calculations are presented in Table 108b.

The means are presented in Table 108a and percentages in Table 108b. The economic variables for the fertilizer and agricultural chemicals departments are also presented. These variables are discussed in the following sections.

For the output variable, total net commodity sales, the treatment general managers had a "higher" percentage increase than the control general managers for all three mean comparisons - 1961 versus 1960, 1962 versus 1960 and average mean versus 1960. For the gross profit variable, total gross commodity margins, the treatment general managers had a high percentage increase for all three mean comparisons - 1961 versus 1960, 1962 versus 1960 and average mean versus 1960.

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*The rationale for these indices was presented in the theoretical orientations chapter, pages 121-124. The general computational procedures were discussed in the method and procedure section of the section of the methodology chapter, pages 158-161. The specific measures used to operationalize the general level concept of economic returns are discussed on pages 232-236 (total business), page 236 (fertilizer department), page 250 (agricultural chemical department).

The measures of profit maximization derived from the theory of the firm included: total net operating revenue (for a manager with all inputs given), ratio of total net operating profits to total tangible operating assets (manager who is given a fixed amount of capital and can make decisions regarding both current and fixed inputs) and ratio of total operating profits to total fixed assets (managers who can change current inputs.) The treatment general managers increased their 1961, 1962 and average means over the 1960 mean for all three measures. For control general managers their 1961, 1962 and average means were less than the 1960 mean for all three measures.

There are commonly used ratios for testing the profitability of the business firm as related to sales.* It is generally assumed within relevant ranges, the larger the ratio the higher the profitability of the business firm as related to sales. The treatment general managers had a higher percentage increase (or lower percentage decrease) than the control general managers for all three mean comparisons - 1961 versus 1960, 1962 versus 1960 and average mean versus 1960.*

For the variable which reflects production costs compared to sales, ratio of total production expense to total net commodity sales; it is generally assumed, with relevant ranges, the lower the ratio the more the manager is approaching efficient production. The treatment general managers had a lower percentage increase than the control general managers for all three mean comparisons - 1961 versus 1960, 1962 versus 1960 and average mean versus 1960.

Using the descriptive approach, the direction and magnitude of change for each of the economic variables for the total firm were examined. There appears to be a trend in favor of the treatment general managers for each of these variables.

There are several possible explanations for the lack of statistical support of General Hypothesis 5. The previously discussed explanations applicable to this hypothesis include: 1) lack of precise measuring instruments, 2) sample size and related problems, 3) no difference in change between the two groups of general managers, 4) interviewing influence, 5) training programs probably tend more to reinforce behavior rather than convert behavior,

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*For the theoretical, procedures to make dealers comparable, and measurements used see pages 121-124, 158-161, and 232-236.

Table 108a. Means for economic variables

Table number and title*		Year	Treatment	Control	Total
Table 69	Total net commodity sales	1960	$777,948	$1,230,141	$ 958,825
		1961	778,847	1,214,380	953,060
		1962	864,126	1,313,580	1,043,907
		Average $\frac{(1961+1962)}{2}$	821,486	1,263,980	998,484
Table 70	Total gross commodity margins	1960	$ 54,355	$ 117,236	$ 79,507
		1961	66,349	132,294	92,727
		1962	75,123	122,139	93,929
		Average $\frac{(1961+1962)}{2}$	70,736	127,216	93,328
Table 71	Total net operating revenue	1960	$113,531	$ 208,240	$ 151,415
		1961	117,712	206,603	153,268
		1962	117,895	202,341	151,674
		Average $\frac{(1961+1962)}{2}$	117,804	204,472	152,471
Table 72	Ratio of total net operating profits to total tangible operating assets	1960	.06860	.12065	.08942
		1961	.07541	.09592	.08361
		1962	.07352	.07827	.07542
		Average $\frac{(1961+1962)}{2}$	.07446	.08710	.07952
Table 73	Ratio of total net operating profits to total fixed assets	1960	.15410	.24152	.18907
		1961	.20157	.19967	.20081
		1962	.22200	.16553	.19941
		Average $\frac{(1961+1962)}{2}$	.21178	.18260	.20011
Table 74	Ratio of total gross commodity margin to total net commodity sales	1960	.07651	.09147	.08249
		1961	.08831	.10400	.09459
		1962	.09251	.09178	.09222
		Average $\frac{(1961+1962)}{2}$	.09041	.09789	.09340
Table 75	Ratio of total net operating revenue to total net commodity sales	1960	.14098	.15978	.14850
		1961	.14714	.16308	.15352
		1962	.13644	.14885	.14141
		Average $\frac{(1961+1962)}{2}$	.14179	.15596	.14746

(Continued)

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[*] The frequency distributions and means for the economic variables were presented earlier in this report in the tables listed in this column.

Table 108a. (continued)

Table number and title		Year	Treatment	Control	Total
Table 76	Ratio of total net operating profits to total net commodity sales	1960	.02539	.04843	.03461
		1961	.02418	.04250	.03151
		1962	.01969	.03373	.02531
		Average $\frac{(1961+1962)}{2}$	.02194	.03812	.02841
Table 77	Ratio of total production expense to total net commodity sales	1960	.11560	.11133	.11389
		1961	.12299	.12055	.12201
		1962	.11674	.11512	.11609
		Average $\frac{(1961+1962)}{2}$	.11986	.11783	.11905
Table 78	Fertilizer net sales	1960	$65,618	$86,705	$74,053
		1961	75,184	84,457	78,894
		1962	93,202	97,573	94,950
		Average $\frac{(1961+1962)}{2}$	84,193	91,015	86,922
Table 79	Tons of fertilizer sold	1960	842	1,269	1,013
		1961	994	1,266	1,103
		1962	1,211	1,409	1,290
		Average $\frac{(1961+1962)}{2}$	1,102	1,338	1,196
Table 80	Fertilizer net revenue	1960	$10,898	$12,837	$11,673
		1961	12,778	13,700	13,147
		1962	16,826	14,191	15,772
		Average $\frac{(1961+1962)}{2}$	14,802	13,946	14,460
Table 81	Ratio of fertilizer net profit to fertilizer fixed assets	1960	.41962	.16407	.31740
		1961	.36224	.11170	.26203
		1962	.24031	.10935	.18793
		Average $\frac{(1961+1962)}{2}$	.30128	.11053	.22498
Table 82	Agricultural chemicals net sales	1960	$ 4,546	$ 6,660	$ 5,392
		1961	6,881	8,680	7,601
		1962	6,772	8,087	7,298
		Average $\frac{(1961+1962)}{2}$	6,826	8,384	7,450

Table 108b. Percent 1961 mean of 1960 mean; percent 1962 mean of 1960 mean; and percent 1961 + 1962 mean of 1960 mean

Table number and title*		Year	Treatment	Control	Total
Table 69	Total net commodity sales	% 1961 of 1960	100.115	98.718	99.398
		% 1962 of 1960	111.077	106.782	108.873
		% $\frac{1961+1962}{2}$ of 1960	105.596	102.750	104.136
Table 70	Total gross commodity margins	% 1961 of 1960	122.066	112.844	116.627
		% 1962 of 1960	138.208	104.182	118.139
		% $\frac{1961+1962}{2}$ of 1960	130.137	108.512	117.383
Table 71	Total net operating revenue	% 1961 of 1960	103.682	99.213	101.223
		% 1962 of 1960	103.843	97.167	100.171
		% $\frac{1961+1962}{2}$ of 1960	103.763	98.190	100.697
Table 72	Ratio of total net operating profits to total tangible operating assets	% 1961 of 1960	109.927	79.502	93.502
		% 1962 of 1960	107.172	64.873	84.343
		% $\frac{1961+1962}{2}$ of 1960	108.542	72.192	88.928
Table 73	Ratio of total net operating profits to total fixed assets	% 1961 of 1960	130.804	82.672	106.209
		% 1962 of 1960	144.062	68.536	105.468
		% $\frac{1961+1962}{2}$ of 1960	137.430	75.604	105.839
Table 74	Ratio of total gross commodity margin to total net commodity sales	% 1961 of 1960	115.422	113.698	114.668
		% 1962 of 1960	120.912	100.338	111.795
		% $\frac{1961+1962}{2}$ of 1960	118.167	107.018	113.225
Table 75	Ratio of total net operating revenue to total net commodity sales	% 1961 of 1960	104.369	102.065	103.380
		% 1962 of 1960	96.779	93.159	95.225
		% $\frac{1961+1962}{2}$ of 1960	100.574	97.609	99.299
Table 76	Ratio of total net operating profits to total net commodity sales	% 1961 of 1960	95.234	87.755	91.043
		% 1962 of 1960	77.550	69.646	73.129
		% $\frac{1961+1962}{2}$ of 1960	86.411	78.711	82.086

(Continued)

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[*] The frequency distributions and means for the economic variables were presented earlier in this report in the tables listed in this column.

Table 108b. (continued)

Table number and title		Year	Treatment	Control	Total
Table 77	Ratio of total production expense to total net commodity sales	% 1961 of 1960	106.392	108.281	107.129
		% 1962 of 1960	100.986	103.404	101.931
		% $\frac{1961+1962}{2}$ of 1960	103.685	105.838	104.530
Table 78	Fertilizer net sales	% 1961 of 1960	114.578	97.407	106.537
		% 1962 of 1960	142.037	112.534	128.218
		% $\frac{1961+1962}{2}$ of 1960	128.307	104.970	117.378
Table 79	Tons of fertilizer sold	% 1961 of 1960	118.052	99.763	108.884
		% 1962 of 1960	143.824	111.032	127.344
		% $\frac{1961+1962}{2}$ of 1960	130.878	105.437	118.065
Table 80	Fertilizer net revenue	% 1961 of 1960	117.250	106.722	112.627
		% 1962 of 1960	154.395	110.547	135.115
		% $\frac{1961+1962}{2}$ of 1960	135.823	108.639	123.875
Table 81	Ratio of fertilizer net profit to fertilizer fixed assets	% 1961 of 1960	86.325	68.080	82.555
		% 1962 of 1960	57.268	66.648	59.209
		% $\frac{1961+1962}{2}$ of 1960	71.798	67.367	70.882
Table 82	Agricultural chemicals net sales	% 1961 of 1960	151.363	130.330	140.968
		% 1962 of 1960	148.966	121.426	135.348
		% $\frac{1961+1962}{2}$ of 1960	150.153	125.885	138.167

and 6) restrictions imposed by relevant aspects of the situation including both the physical and social environment.

Concerning the precision of measurement, the majority of the monthly economic data collected for adjustment purposes was collected at the end of the training period. In some cases, records were difficult to obtain. In other cases the economic data needed had to be computed from records which had been in storage for a time. Short hand descriptions used three years ago were sometimes difficult to interpret. If forms had been provided the general managers at the beginning of the project, probably more accurate economic data in the form needed would have been available for the analysis. In making the number of adjustments that were made in this research it is always possible for errors to occur. All adjustments and calculations were made independently by two separate individuals and a third party checked the computations. However, certain interpretations of short hand descriptions and certain numbers not written clearly had to be made.

Many of the factors about the social system (business firm) in which the general manager works may become relevant as an attempt is made to implement changes to increase economic returns to the business. These factors were discussed in detail in the theoretical orientations chapter. Certain restrictions imposed by the over-all management, physical facilities, formal structure, informal structure, goals of the business firm, etc. may have hindered or prevented the attempt to make certain changes in the operations of the business. Other factors such as current purchasing patterns, general economic conditions, weather and cropping conditions also have an impact upon the economic returns to a business. It was assumed that these factors were randomly distributed. Also, changes made in the operations of the business may not be reflected immediately in the economic returns to the business. It may take two or three years or even longer for certain changes to affect the profitability of a business.

Although the fifth general hypothesis was not given support by the statistical tests of the related empirical hypotheses, there appears to be a trend in favor of the treatment general managers.

Economic returns to the fertilizer department Four empirical hypotheses relate to General Hypothesis 6: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the economic returns to the fertilizer department than will similar general managers not participating in the same training program.

None of the four empirical hypotheses were given statistical support. All of these tests were made on the adjusted means, i.e., adjusted for beginning differences. Analysis of covariance was used.

As in the case of economic returns to the entire business, comparisons were made based on the percentage that the 1961 mean is of the 1960 mean, the 1962 mean is of the 1960 mean and the average mean $\left(\frac{1961 + 1962}{2}\right)$ is of the 1960 mean. The means are presented in Table 108a and percentages in Table 108b.

For the output variables of the fertilizer department, fertilizer net sales and tons of fertilizer sold, the treatment general managers had a higher percentage increase than the control general managers for all three mean comparisons - 1961 versus 1960, and 1962 versus 1960 and average mean versus 1960.

For fertilizer net revenue, the treatment general managers had a higher percentage increase than the control general managers for all three mean comparisons - 1961 versus 1960, 1962 versus 1960, and average mean versus 1960.

The measure of profit maximization derived from the theory of the firm under the assumption that managers could change current inputs was ratio of fertilizer net profit to fertilizer fixed assets. The 1961, 1962 and average means for this ratio was less than the 1960 mean for both the treatment and control general managers. The 1961 mean for the treatment general managers was a larger percentage of the 1960 mean for the treatment general manager. The average mean for the treatment general managers was a larger percentage of the 1960 mean than was the average mean of the 1960 for the control general managers.

Although the sixth general hypothesis was not supported by the statistical tests of the related hypotheses, there appears to be a trend in favor of the treatment general managers.

There are several possible explanations of the lack of statistical support of General Hypothesis 6. The same explanations mentioned for General Hypothesis 5 related to the total business are applicable in this case so they will not be repeated. Although the sixth general hypothesis was not given support by the statistical testing of the related empirical hypotheses, there appears to be a trend in favor of the treatment general managers.

Economic returns to the agricultural chemical department Only one empirical hypothesis relates to General Hypothesis 7: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in agricultural chemical sales than will similar general managers not participating in the same training program. Difficulties encountered in prorating expenses prevented obtaining additional economic returns to agricultural chemicals department.

This empirical hypothesis was not given statistical support. The test was based on the adjusted means for the treatment and control managers. Analysis of covariance was used.

In a descriptive framework, the average mean for agricultural chemical sales for the treatment general managers was 150.15 percent of the beginning (1960) mean compared to 125.88 percent for the control general managers.

There are probably several possible explanations for this lack of support of General Hypothesis 7. The same explanations mentioned for General Hypothesis 5 which was related to the total business are applicable in this case. The reader is referred to that discussion. Although the seventh general hypothesis was not given support by the statistical testing of the related empirical hypothesis, the trend appears to be in favor of treatment general managers.

Conclusion

The results of the statistical analysis gave little statistically significant support to empirical hypotheses. From this, it is concluded that the general hypotheses were also not supported. However, based on the descriptive statistics and discussion regarding findings, it appears that a slight trend in favor of the treatment general managers does exist. The treatment general managers tended to perceive that they had made more changes in certain areas of knowledge, attitudes and performance than control general managers (Appendix A). Also, the treatment general managers perceived that the training program had an influence in changing certain areas of their knowledge, attitudes and performance (Appendix B and C). In a very general framework, there may be two major possible explanations for the results obtained. These two explanations are: 1) there was a differential change between the treatment and control general managers, but it was not measured or 2) there was no difference in change between the two groups of general managers.

There was a difference in outcomes but not measured. Is this a reasonable alternative? In discussing each of the general hypotheses certain explanations were given regarding possible reasons for lack of support of the hypothesis. The reasons mentioned which apply to this alternative included: 1) lack of precise measure instruments (in some cases) and some of the measures being bounded by an upper limit, 2) sample size and related problems, 3) large areas of training being measured by only a few empirical measures, 4) interviewing influence combined with an upper limit on some measures, 5) change in frame of reference, and 6) difficulty in measuring change if training programs tend to reinforce behavior rather than convert behavior. Because each of these reasons have been discussed in this chapter, they will not be discussed in detail in this subsection. The limitations imposed by sample size has been discussed several times. The problem of precision in measuring instruments and measures being bounded have been discussed under each general hypothesis.

Each of these reasons appears to apply to this exploratory research study. Each of the reasons or various combinations of the reason could lead to the lack of statistical support of the hypotheses. Thus, it appears that a possible alternative explanation is that there was a difference between treatment and control general managers but it was not measured to the degree that statistically significant differences were observed.

There was no difference in change between the two groups of general managers even though the treatment general managers participated in the training program. Is this a reasonable alternative? On discussing each of the general hypotheses certain explanations were given regarding possible reasons for lack of support of the hypothesis. The reasons mentioned which apply to this alternative include: 1) overlap of training with other training meetings and sessions available to both treatment and control general managers; 2) availability of training materials and information and other sources of information available to both treatment and control general managers; 3) content areas taught in training program may not have been relevant to treatment general managers--based on how subject matter areas were selected this seems unlikely; 4) some learning and attitude principles, as stated in theoretical orientations chapter, may not have been relevant or some may have been omitted; 5) information was not transferred effectively due to content, content level and the manner in which the training program was conducted; 6) restrictions imposed by certain relevant aspects of the situation including both the physical and social environment; and 7) the time period between training and data collection may have been too short for certain types of changes to take place. Because each of these reasons have been discussed in this chapter they will not be discussed in detail in this subsection.

Each of the reasons or various combinations could lead to lack of statistical support of the hypotheses. Thus, it appears that a possible alternative explanation is that there was no difference in change between the two groups of general managers even though the treatment general managers participated in the training program. A question, however, remains unanswered, if it is decided that the training program did not have any influence on the behavior of the general managers and on their business firms. That question is, "Why did the treatment general managers perceive that they had greater changes than control managers and that the training program did have the effect of bringing about certain changes in themselves and in their businesses?" The specific changes were discussed under the general hypotheses in this section and are reported in Appendices A, B and C. One possible answer to this dilemma may be that there were certain variables, which it was assumed were randomly distributed and which were not controlled, that had more effect than was anticipated on both groups of general managers. Thus, the training program was "contaminated" to a greater extent than anticipated.

One additional question was asked the treatment general managers concerning their evaluation of the training program. The open end question was: "In general what happened to you as a manager and to your business as a result of your participation in the training program?" The responses to this question are reported in Table 110.

Essentially, the basic concept being tested in the hypotheses is "adequately conducted training program." If the training program was adequately conducted, then it would be expected that treatment and control general managers would differ on measures used in this research. Again, it is pointed

Table 110. Responses to the question: "In general what happened to you as a manager and to your business as a result of your participation in the training program?"

Dealer number	Response
1	I gained confidence, business gained sales.
2	Had some increase in business. I thought it was an honor to be in the program. People come in and talk things over; they think I can answer since I was the one in the training program.
3	(I am) better qualified as source of information on fertilizer and agricultural chemicals. Farmers look more to us as a source of information than they did before. They have more respect for me now. If I don't have the information then I get on the phone and get it.
4	Knowledge and confidence. The business did increase. Local people got more of an idea they could come here for technical information.
5	Program gave me more enthusiasm for increasing sales in the fertilizer department and consequently helped the company realize more sales and savings.
6	1) learned and helped me to communicate with my customers more effectively. Has given me a lot of basic knowledge which I can pass on to customers. Has given me a lot of confidence in my ability to manage which I didn't have. Increased sales by adding new services. (Probe: Has training program been useful in other areas than fertilizer and agricultural chemicals?) There was a carry over in field of management to other parts of the business.
7	1) learned a lot about fertilizer, chemicals and selling. 2) am better manager than I was - probably doing things differently than I did without realizing it. Business, hard to say. Appreciated opportunity to participate in program. It was well worth the time. I would do it again.
8	I'm still manager--increase in business is hard to credit to any specific training.

out that "adequately conducted" is being considered only in terms of outcomes rather than training methods and procedures per se. If one accepts general support of the hypotheses at a statistical significant level as his criteria for judging adequacy then the answer appears relatively clear cut--it was not adequate. However, if one is willing to accept other criteria then the answer may be different. The hypotheses, in general, were not given statistical support. However, 11 of the 73 empirical hypotheses were given statistical support and when descriptive statistics are used there appears to be a trend in favor of the treatment general managers. General managers' perception of changes and their perception of the influence of the training program tend to add support to this trend. Also, these perceptions may be related to their subsequent behavior. This may result in changes after the 1963 data collection. However, in reaching a decision about the adequacy of training in terms of outcomes, the resources which go into training may be considered. The resources used in this training program were substantial. Based on participant observation, trends, descriptive statistics and the general managers' perceptions, the measured results from this training program might be judged to approach some lower level criteria which one might use to accept the training program as adequate. Basically, there is still a question about the adequacy of this training program as determined by the measured outcomes in this research. Perhaps with larger sample size and more precise measures, a more specific conclusion to the question of adequacy could be reached.

In comparison to other similar types of training programs being carried out, this training program may have been among the best--relatively little data exist where tangible results of training are measured as broadly and precisely (despite the stated limitations) as in this experiment.

Suggestions for future research

Suggestions for future research included research efforts in the areas of: 1) goals of the local retail business firm, 2) goals of general managers of local retail business firms, 3) characteristics of local business firms which lead to successful business operations, 4) characteristics of general managers which lead to successful operational management in business firms, and 5) the development of more precise measuring devices and instruments for these areas. Increased knowledge in these areas would assist the researcher in his attempt to specify his theory or theoretical orientations, concepts, operational measures and hypothesize relationships to determine the effectiveness of training programs for managers and for employees in local retail business firms. If training programs are going to be conducted and research carried out to determine the influence of these programs, it appears that increased understanding of these areas should be beneficial. Additional empirical testing of many of the hypotheses used in this study should be fruitful. As pointed out in the theoretical orientations chapter of this thesis, there appears to be a lack of empirical research in the above areas. If the effectiveness of training programs for general managers of retail business is to be determined more information is desirable about: how goals are formulated, how managers actually manage, how organizations are organized, how organizations adapt and adjust to change, how decision making takes place in the business firm, the communication patterns, and gathering and analyzing information. Major personal, business, merchandising and educational service characteristics probably have to be logically interrelated if the general manager is to make changes and improvements which will lead to successful management. In the areas mentioned above, the development of precise empirical measures are necessary if the body of knowledge about the general manager and his retail business firm is to be increased. Additional research and the development of precise measuring instruments should add to the understanding of management and the business firm.

In this research project the sample size was limited because of the exploratory nature of the project, the detailed data to be collected from each general manager, and in certain areas the data collecting instruments had to be developed. In future research of this type it is suggested that an adequate sample size be used to provide data for the statistical testing of hypotheses. In deciding on sample size, consideration should be given to "turn over" of general managers, changes of ownership of business firms, and firms which may go out of business during the time period of the experiment. Also, it is suggested that the general managers are provided forms to record the economic data which will be used in the analysis. This should increase the uniformity of economic data collected from the various businesses and greatly reduce the number and types of necessary adjustments to make the data comparable. In additional research, if the interviewing is to be as intensive as in this project, a third group of general managers may want to be included in the project. Only limited beginning benchmark and intensive "after" data would be collected from these general managers. The beginning benchmark data to be collected would be limited to the data needed to determine that "similar" managers are in the three groups. The same data would be collected from all three groups. The same data would be collected from all three groups in the after data collection. By this method an attempt could be made to determine the influence of the intensive interviewing.

Chapter 6

SUMMARY

This monograph reports the findings of a study to determine the influence of an intensive training program for general managers of local retail farm supply businesses which had fertilizer and agricultural chemicals among their product lines. An attempt was made to determine changes in: 1) general manager's knowledge, 2) general manager's attitudes, 3) general manager's performance, 4) internal environment and activities of the business firm, and 5) economic returns of the total (entire) business, the fertilizer department and agricultural chemicals department. To accomplish this purpose the problem setting was described, the objectives and content areas of the training program were reviewed, changes in the above areas were predicted and an attempt was made to measure the changes. The specific objectives were to:

1. Determine the magnitude of predicted behavioral changes made by the general managers of local retail farm supply businesses as a result of participation in an intensive training program.
2. Determine the magnitude of predicted changes in selected internal environmental and activity business firm variables.
3. Determine the magnitude of predicted changes in selected business firm economic return variables.
4. Determine the magnitude of predicted changes in selected business firm intervening and economic variables in the fertilizer department and agricultural chemicals departments.

The conceptual framework in the theoretical orientations chapter included a discussion of human behavior and social systems. It was assumed that if the trainer is to be effective he must have some basic understanding in a number of areas. The following are some of those areas: human behavior, i.e., how man thinks, how man learns, how he forms and changes attitudes and how man is motivated to learn, internalize and use learned behavior. The trainer needs to know and understand the type of social system in which the trainee works, his occupational role in that social system, the goals and objectives of the trainee in that social system and the goals of the system. The trainer should know what changes in behavior can be expected in the trainee given the freedom and constraints which he has in his occupational role. The trainer needs to know the abilities, skills, areas of competencies and areas of deficiencies to which training can be directed. Many of the same types of concepts and data that were suggested as needed by the trainer are also needed by the researcher if he is to attempt to specify his theoretical orientations, concepts and operational measures and hypothesize relationships to test the effectiveness of a training program.

When a training program has been adequately conducted, the expectation is that the experience will modify the behavior of the persons trained. If the training is conducted for persons who are members of business firms, the training is usually directed at changing the behavior of the individual receiving the training so that he can more adequately perform his occupational role. It is assumed that the resultant behavior will result in certain activities that will contribute to the attainment of goals and objectives of the organization in which he works. The personnel conducting the Iowa State University experimental dealer training program expected changes in the general manager's behavior, in the activities of the business firm for which he works and outcomes for his business firm.

In the theoretical orientations chapter, theoretical orientations concerning human behavior, learning, social systems, formal organizations, retail business firms and management in the retail business firm were presented to generate the general and supporting hypotheses. The first step was to consider a general framework of human behavior followed by an examination of generalizations and propositions concerning learning and attitude formation and change. This was followed by a discussion to define and discuss the environment in which the general manager makes and implements his decisions. The approach to accomplish this objective was to: 1) discuss social systems at a general level, 2) present certain generalizations and propositions about formal organizations, 3) describe the local retail farm supply firm as a social system and as a special type of formal organization, and 4) present generalizations and propositions about this system. This was followed by a discussion of management and functions of operational management in the local retail farm supply firm. At the most general level, three theoretical propositions were stated as follows:

1. Individuals can be motivated to participate in a series of formalized learning situations.

2. Individuals participating in a series of formalized learning situations will have greater changes (direction predicted) in relevant aspects of their adaptive behavior in subsequent situations than will individuals not participating in the same series of formalized learning situations.

3. Individuals for whom learning has taken place as a result of participation in a series of formalized learning situations will have greater changes (direction predicted) in specified outcomes from their subsequent adaptive behavior than will similar individuals not participating in the particular series of formalized learning situations.

After discussing learning, attitude formation and change, social systems, formal organizations, business firms and management in business firms these theoretical propositions were restated in the following manner, some at a lower level:

Individuals can be motivated to participate in an adequately conducted training program.

Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their knowledge in those content areas included in the program than will similar individuals not participating in the same training program.

Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their attitudes than will similar individuals not participating in the same training program.

Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in their performance than will similar individuals not participating in the same training program.

Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in the elements and elemental processes, master processes and activities in their occupational social system than will similar individuals not participating in the same training program.

Individuals participating in adequately conducted training programs will have greater changes (direction predicted) in the outcomes of their occupational social system than will similar individuals not participating in the same training program.

The following general hypotheses were derived:

General Hypothesis 1: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their knowledge of those content areas included in the training program than will similar general managers not participating in the same training program.

General Hypothesis 2: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their attitudes related to those content areas included in the training program than will similar general managers not participating in the same training program.

General Hypothesis 3: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in their operational management performance than will similar general managers not participating in the same training program.

General Hypothesis 4: General managers participating in an adequately conducted training program will have greater changes (direction predicted) 1) in the function of advising strategic (over-all) management, 2) in the internal environment of the firm, and 3) in the activities of the firm than will similar general managers not participating in the same training program.

General Hypothesis 5: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the economic returns to the entire business operations than will similar general managers not participating in the same training program.

General Hypothesis 6: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in the economic returns to the fertilizer department than will similar general managers not participating in the same training program.

General Hypothesis 7: General managers participating in an adequately conducted training program will have greater changes (direction predicted) in agricultural chemicals sales than will similar general managers not participating in the same training program.

Several supporting hypotheses were stated for the general hypotheses. These supporting hypotheses for each area are as follows:

The knowledge areas specified by supporting hypotheses were: 1) knowledge about fertilizer, 2) knowledge about agricultural chemicals, 3) knowledge about farmer customers, and 4) knowledge about business management.

The areas for attitude change specified by supporting hypotheses were: 1) attitudes toward fertilizer, 2) attitudes toward agricultural chemicals, and 3) attitudes toward operational management.

The areas specified by supporting hypotheses related to performance were: 1) operational management planning performance, 2) employee management performance, 3) procurement management performance, 4) inventory management performance, 5) retail credit management performance, and 6) sales management performance.

The following areas were included in supporting hypotheses related to internal environment and activities of the firm: 1) function of advising strategic (over-all) management, 2) goals for the fertilizer and agricultural chemicals departments, 3) fertilizer application services, and 4) business firm facilities.

The experimental design of the project on which this study is based called for two groups of general managers. The treatment group of general managers participated in the training program while the control group did not. There were eight matched pairs of general managers (eight treatment, two alternate treatment and eight control) in the study. They were all general managers (two were owner-manager) of established farm supply businesses for which fertilizer and agricultural chemicals were product lines. The businesses were all located in a nine county area in north central Iowa. The types of retail farm supply businesses represented were private ownership - including partnership and family corporations, Farm Service companies, line corporations and cooperatives. Of the 18 general managers who composed the original grouping, data were available for eight treatment and five control managers in the areas of knowledge, attitudes and performance. Economic data were secured for nine treatment and six control.

The training program consisted of a five-day workshop followed by 16 meetings during the next two and one-half years. The subject matter presented consisted of basic business management, merchandising and product information about fertilizer and agricultural chemicals. Iowa State University extension specialists conducted the majority of the training.

Knowledge, attitude, performance and activity data were collected from the general managers through personal interviews conducted before, during and after the training period. Economic data were collected from the business records of the retail firms.

Only five of the 73 derived empirical hypotheses which compared treatment and control general managers were given statistical support at the .05 level and only six additional empirical hypotheses were supported at the .10 level. These included: three in the area of knowledge, three in the area of attitudes, one in the area of performance and four in the area of general management and firm variables. From the results of the analysis used to test the 73 empirical hypotheses, the conclusion was made that the supporting hypotheses and thus the general hypotheses were not statistically supported.

In the findings chapter under each general hypothesis possible explanations for the findings were discussed. The small sample size and problems of obtaining precise measures of change may have been contributing factors to the results obtained by the statistical analyses. Additional descriptive statistics, discussion of the measures tested and responses to additional questions not included in the statistical tests were presented. Part of the discussion centered on a percentage comparison for some measures, comparison of means for other measures, and a percentage comparison of means for economic measures to determine if a trend in favor of either treatment or control general managers existed. Variables in favor of the treatment general managers included: five in the area of knowledge, two in the area of attitudes, 13 in the area of performance, four in the area of general management and firm activities and 14 in the area of economic returns (using the average for both 1961 and 1962--if 1961 versus 1960 is used, the number is 14--if 1962 versus 1960 is used, the number is 13.) If these 38 variables are added to the 11 statistically significant variables, a total of 49 of the 73 variables were in favor of the treatment general managers. For 17 variables the trend was not in favor of either treatment or control general managers. The trend was in favor of the control general managers on seven variables.

Part of the discussion centered on the general managers' perceptions of changes which had taken place in themselves and within their businesses during the training period. In general, the treatment general managers perceived greater changes than the control general managers for certain areas of knowledge, attitudes and performance. Also, in general, the treatment general managers perceived that the training program did have an influence on certain changes in the areas of knowledge, attitudes and performance.

As previously pointed out, descriptive statistics and discussion was presented because of the exploratory nature of the project, the small size and limitations of the statistical analysis. The statistical analysis used did provide a systematic and unbiased method of analyzing the data. In examining the results of the statistical tests, the limitations should be kept in mind; however, it is sometimes desirable to make inferences beyond the statistical tests. Ultimately, each individual may set his own criteria of what is of practical significance. The descriptive statistics and comparison of percentages and means for the treatment and control group was presented to provide additional insights about the influence of the training program in this exploratory research.

Based on participant observation, trends, descriptive statistics and the general managers' perceptions and within the limitations of sample size and length of training, it is the judgment of the authors that the training program was successful in bringing about changes in selected areas of knowledge, attitudes and performance. It appears the treatment dealers had more favorable changes in the economic returns to their businesses. More research on this type of training program is needed before generalizations about this type of training can be made concerning dealers in different situations and environments.

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APPENDIX A

General Managers' Perception of Change

Table 111. Fertilizer knowledge

Item	Classification	0		1		2		3		4			
		None		Little		Some		Much		Very much		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your understanding of the potential for fertilizer?	Treatment	0	0.0	0	0.0	1	12.5	3	37.5	4	50.0	8	100.0
	Control	0	0.0	0	0.0	3	60.0	2	40.0	0	0.0	5	100.0
During the past three years to what extent have you increased your understanding of the fertilizer industry?	Treatment	0	0.0	0	0.0	1	12.5	3	37.5	4	50.0	8	100.0
	Control	0	0.0	0	0.0	1	20.0	4	80.0	0	0.0	5	100.0
During the past three years to what extent have you increased your understanding of product trends for fertilizer?	Treatment	2	25.0	0	0.0	1	12.5	3	37.5	2	25.0	8	100.0
	Control	2	40.0	0	0.0	3	60.0	0	0.0	0	0.0	5	100.0
During the past three years to what extent have you increased your understanding of the procedures for conducting demonstrations?	Treatment	0	0.0	1	12.5	3	37.5	2	25.0	2	25.0	8	100.0
	Control	3	60.0	1	20.0	1	20.0	0	0.0	0	0.0	5	100.0

Table 112. Customer knowledge

Item	Classification	0 None		1 Little		2 Some		3 Much		4 Very much		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your understanding of your role with your farmer customers?	Treatment	1	12.5	0	0.0	3	37.5	2	25.0	2	25.0	8	100.0
	Control	0	0.0	1	20.0	3	60.0	1	20.0	0	0.0	5	100.0
During the past three years to what extent have you increased your understanding of what farmers expect of you as a fertilizer dealer?	Treatment	0	0.0	0	0.0	2	25.0	4	50.0	2	25.0	8	100.0
	Control	1	20.0	0	0.0	3	60.0	1	20.0	0	0.0	5	100.0
During the past three years to what extent have you increased your understanding of the economic and social situation of your farmer customers?	Treatment	2	25.0	1	12.5	1	12.5	2	25.0	2	25.0	8	100.0
	Control	0	0.0	1	20.0	3	60.0	1	20.0	0	0.0	5	100.0
During the past three years to what extent have you increased your understanding about what should go into planning fertilizer programs for farmers?	Treatment	1	12.5	0	0.0	1	12.5	4	50.0	2	25.0	8	100.0
	Control	0	0.0	0	0.0	4	80.0	1	20.0	0	0.0	5	100.0

Table 113. Management knowledge and chemical knowledge

Item	Classification	0		1		2		3		4			
		None		Little		Some		Much		Very much		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
MANAGEMENT KNOWLEDGE													
During the past three years to what extent have you increased your understanding of plant and, facility alternatives available for your fertilizer department?	Treatment	0	0.0	2	25.0	1	12.5	2	25.0	3	37.5	8	100.0
	Control	0	0.0	0	0.0	1	20.0	4	80.0	0	0.0	5	100.0
During the past three years to what extent have you increased your understanding of merchandising, promotional, and advertising alternatives for your business?	Treatment	1	12.5	1	12.5	2	25.0	4	50.0	0	0.0	8	100.0
	Control	3	60.0	0	0.0	1	20.0	1	20.0	0	0.0	5	100.0
CHEMICAL KNOWLEDGE													
During the past three years to what extent have you increased your understanding of product trends for agricultural chemicals?	Treatment	2	25.0	1	12.5	3	37.5	1	12.5	1	12.5	8	100.0
	Control	1	20.0	2	40.0	2	40.0	0	0.0	0	0.0	5	100.0

Table 114. Attitudes toward fertilizer and agricultural chemicals

		0		1		2		3		4			
Item	Classification	None		Little		Some		Much		Very much		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your confidence in selling fertilizer?	Treatment	0	0.0	0	0.0	1	12.5	5	62.5	2	25.0	8	100.0
	Control	0	0.0	0	0.0	5	100.0	0	0.0	0	0.0	5	100.0
During the past three years to what extent have you increased your ideas about the importance of fertilizer use for farmers?	Treatment	0	0.0	1	12.5	0	0.0	3	37.5	4	50.0	8	100.0
	Control	0	0.0	0	0.0	3	60.0	2	40.0	0	0.0	5	100.0
During the past three years to what extent have you increased your confidence in making recommendations on fertilizer to farmers?	Treatment	0	0.0	0	0.0	0	0.0	3	37.5	5	62.5	8	100.0
	Control	0	0.0	0	0.0	2	40.0	3	60.0	0	0.0	5	100.0
During the past three years to what extent have you increased your confidence in making recommendations on agricultural chemicals to farmers?	Treatment	0	0.0	1	12.5	3	37.5	2	25.0	2	25.0	8	100.0
	Control	1	20.0	0	0.0	2	40.0	2	40.0	0	0.0	5	100.0
During the past three years to what extent have you increased your ideas about the importance of agricultural chemicals use for farmers?	Treatment	0	0.0	1	12.5	2	25.0	3	37.5	2	25.0	8	100.0
	Control	0	0.0	1	20.0	2	40.0	2	40.0	0	0.0	5	100.0

Table 115. Attitudes toward operational management

Item	Classification	0		1		2		3		4			
		None		Little		Some		Much		Very much		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your confidence in making major decisions?	Treatment	0	0.0	0	0.0	2	25.0	4	50.0	2	25.0	8	100.0
	Control	0	0.0	2	40.0	2	40.0	1	20.0	0	0.0	5	100.0
During the past three years to what extent have you increased your confidence in your managerial ability?	Treatment	2	25.0	0	0.0	2	25.0	3	37.5	1	12.5	8	100.0
	Control	0	0.0	3	60.0	1	20.0	1	20.0	0	0.0	5	100.0
During the past three years to what extent have you increased your confidence in attempting to influence attitudes and understanding of farmers?	Treatment	0	0.0	0	0.0	2	25.0	5	62.5	1	12.5	8	100.0
	Control	0	0.0	1	20.0	1	20.0	3	60.0	0	0.0	5	100.0

Table 116. Performance in decision making

Item	Classification	0		1		2		3		4			
		None		Little		Some		Much		Very much		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your analysis of various alternatives for your business?	Treatment	1	12.5	1	12.5	5	62.5	0	0.0	1	12.5	8	100.0
	Control	0	0.0	1	20.0	4	80.0	0	0.0	0	0.0	5	100.0
During the past three years to what extent have you increased your effectiveness in making and carrying out decisions related to your business?	Treatment	1	12.5	1	12.5	2	25.0	3	37.5	1	12.5	8	100.0
	Control	0	0.0	3	60.0	1	20.0	1	20.0	0	0.0	5	100.0
During the past three years to what extent have you increased your analysis of your fertilizer trade area in the areas of trend, competition, factors related to sales and use and potentials?	Treatment	1	12.5	0	0.0	3	37.5	2	25.0	2	25.0	8	100.0
	Control	1	20.0	1	20.0	2	40.0	1	20.0	0	0.0	5	100.0
During the past three years to what extent have you increased your use of a systematic process in determining prices and margins in reference to your fertilizer and agricultural chemicals department?	Treatment	3	37.5	1	12.5	4	50.0	0	0.0	0	0.0	8	100.0
	Control	2	40.0	0	0.0	3	60.0	0	0.0	0	0.0	5	100.0

Table 117. Performance in communication

Item	Classi-fication	0		1		2		3		4			
		None		Little		Some		Much		Very much		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you improved your communications with your employees?	Treatment	2	25.0	1	12.5	2	25.0	1	12.5	2	25.0	8	100.0
	Control	2	40.0	0	0.0	3	60.0	0	0.0	0	0.0	5	100.0
During the past three years to what extent have you increased your ability to handle problems and questions from your farmer customers related to fertilizer and agricultural chemicals?	Treatment	0	0.0	0	0.0	2	25.0	5	62.5	1	12.5	8	100.0
	Control	0	0.0	0	0.0	4	80.0	1	20.0	0	0.0	5	100.0
During the past three years to what extent have you increased your effectiveness in motivating and influencing your farmer customers?	Treatment	0	0.0	1	12.5	5	62.5	1	12.5	1	12.5	8	100.0
	Control	0	0.0	1	20.0	4	80.0	0	0.0	0	0.0	5	100.0

Table 118. Iowa State University

Item	Classification	0		1		2		3		4			
		None		Little		Some		Much		Very much		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your use of Iowa State University recommendations in supplying information and giving advice to your farmer customers about fertilizer and agricultural chemicals?	Treatment	0	0.0	1	12.5	1	12.5	2	25.0	4	50.0	8	100.0
	Control	0	0.0	1	20.0	2	40.0	1	20.0	1	20.0	5	100.0
During the past three years to what extent have you increased your confidence in using Iowa State University extension specialists for advice about your business operations?	Treatment	0	0.0	1	12.5	2	25.0	4	50.0	1	12.5	8	100.0
	Control	3	60.0	0	0.0	1	20.0	0	0.0	1	20.0	5	100.0
During the past three years to what extent have you increased your understanding about how Iowa State University makes recommendations?	Treatment	0	0.0	0	0.0	1	12.5	3	37.5	4	50.0	8	100.0
	Control	1	20.0	1	20.0	1	20.0	2	40.0	0	0.0	5	100.0

APPENDIX B

Treatment General Managers' Perception of Influence of Training Program on Changes

Table 119. Fertilizer knowledge. Question: "What effect did the training program have on this change?"

Item	0 None		1 Little		2 Some		3 Much		4 Great		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your understanding of the potential for fertilizer?	0	0.0	0	0.0	1	12.5	4	50.0	3	37.5	8	100.0
During the past three years to what extent have you increased your understanding of the fertilizer industry?	0	0.0	0	0.0	3	37.5	3	37.5	2	25.0	8	100.0
During the past three years to what extent have you increased your understanding of product trends for fertilizer?	2	25.0	0	0.0	2	25.0	3	37.5	1	12.5	8	100.0
During the past three years to what extent have you increased your understanding of the procedures for conducting demonstrations?	0	0.0	1	12.5	2	25.0	3	37.5	2	25.0	8	100.0

Table 120. Customer knowledge. Question: "What effect did the training program have on this change?"

Item	0		1		2		3		4			
	None		Little		Some		Much		Great		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your understanding of your role with your farmer customers?	1	12.5	1	12.5	2	25.0	2	25.0	2	25.0	8	100.0
During the past three years to what extent have you increased your understanding of what farmers expect of you as a fertilizer dealer?	0	0.0	0	0.0	1	12.5	6	75.0	1	12.5	8	100.0
During the past three years to what extent have you increased your understanding of the economic and social situation of your farmer customers?	2	25.0	3	37.5	2	25.0	1	12.5	0	0.0	8	100.0
During the past three years to what extent have you increased your understanding about what should go into planning fertilizer programs for farmers?	1	12.5	0	0.0	2	25.0	1	12.5	4	50.0	8	100.0

Table 121. Management knowledge and chemical knowledge. Question: "What effect did the training program have on this change?"

Item	0		1		2		3		4			
	None		Little		Some		Much		Great		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
MANAGEMENT KNOWLEDGE												
During the past three years to what extent have you increased your understanding of plant and facility alternatives available for your fertilizer department?	0	0.0	2	25.0	4	50.0	1	12.5	1	12.5	8	100.0
During the past three years to what extent have you increased your understanding of merchandising, promotional, and advertising alternatives for your business?	1	12.5	1	12.5	4	50.0	2	25.0	0	0.0	8	100.0
CHEMICAL KNOWLEDGE												
During the past three years to what extent have you increased your understanding of product trends for agricultural chemicals?	3	37.5	0	0.0	2	25.0	3	37.5	0	0.0	8	100.0

Table 122. Attitudes toward fertilizer and agricultural chemicals. Question: "What effect did the training program have on this change?"

Item	0		1		2		3		4			
	None		Little		Some		Much		Great		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your confidence in selling fertilizer?	0	0.0	0	0.0	2	25.0	4	50.0	2	25.0	8	100.0
During the past three years to what extent have you increased your ideas about the importance of fertilizer use for farmers?	0	0.0	0	0.0	0	0.0	6	75.0	2	25.0	8	100.0
During the past three years to what extent have you increased your confidence in making recommendations on fertilizer to farmers?	0	0.0	0	0.0	0	0.0	4	50.0	4	50.0	8	100.0
During the past three years to what extent have you increased your confidence in making recommendations on agricultural chemicals to farmers?	0	0.0	2	25.0	2	25.0	3	37.5	1	12.5	8	100.0
During the past three years to what extent have you increased your ideas about the importance of agricultural chemicals use for farmers?	0	0.0	1	12.5	2	25.0	4	50.0	1	12.5	8	100.0

Table 123. Attitudes toward operational management. Question: "What effect did the training program have on this change?"

Item	0		1		2		3		4			
	None		Little		Some		Much		Great		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
During the past three years to what extent have you increased your confidence in making major decisions?	0	0.0	0	0.0	5	62.5	3	37.5	0	0.0	8	100.0
During the past three years to what extent have you increased your confidence in your managerial ability?	2	25.0	1	12.5	2	25.0	2	25.0	1	12.5	8	100.0
During the past three years to what extent have you increased your confidence in attempting to influence attitudes and understanding of farmers?	0	0.0	0	0.0	3	37.5	4	50.0	1	12.5	8	100.0

Table 124. Performance in decision making. Question: "What effect did the training program have on this change?"

Item	0 None No.	 %	1 Little No.	 %	2 Some No.	 %	3 Much No.	 %	4 Great No.	 %	Total No.	 %
During the Past three years to what extent have you increased your analysis of various alternatives for your business?	2	25.0	1	12.5	3	37.5	1	12.5	1	12.5	8	100.0
During the past three years to what extent have you increased your effectiveness in making and carrying out decisions related to your business?	1	12.5	2	25.0	1	12.5	4	50.0	0	0.0	8	100.0
During the past three years to what extent have you increased your analysis of your fertilizer trade area in the areas of trend, competition, factors related to sales and use and potential?	1	12.5	0	0.0	3	37.5	2	25.0	2	25.0	8	100.0
During the past three years to what extent have you increased your use of a systematic process in determining prices and margins in reference to your fertilizer and agricultural chemicals department?	5	62.5	0	0.0	2	25.0	1	12.5	0	0.0	8	100.0

Table 125. Performance in communication. Question: "What effect did the training program have on this change?"

Item	0 None No.	 %	1 Little No.	 %	2 Some No.	 %	3 Much No.	 %	4 Great No.	 %	Total No.	 %
During the past three years to what extent have you improved your communications with your employees?	2	25.0	1	12.5	3	37.5	1	12.5	1	12.5	8	100.0
During the past three years to what extent have you increased your ability to handle problems and questions from your farmer customers related to fertilizer and agricultural chemicals?	0	0.0	0	0.0	1	12.5	6	75.0	1	12.5	8	100.0
During the past three years to what extent have you increased your effectiveness in motivating and influencing your farmer customers?	0	0.0	1	12.5	3	37.5	4	50.0	0	0.0	8	100.0

Table 126. Iowa State University. Question: "What effect did the training program have on this change?"

Item	0 None No.	 %	1 Little No.	 %	2 Some No.	 %	3 Much No.	 %	4 Great No.	 %	Total No.	 %
During the past three years to what extent have you increased your use of Iowa State University recommendations in supplying information and giving advice to your farmer customers about fertilizer and agricultural chemicals?	0	0.0	1	12.5	1	12.5	3	37.5	3	37.5	8	100.0
During the past three years to what extent have you increased your confidence in using Iowa State University extension specialists for advice about your business operations?	0	0.0	1	12.5	0	0.0	5	62.5	2	25.0	8	100.0
During the past three years to what extent have you increased your understanding about how Iowa State University makes recommendations?	0	0.0	0	0.0	1	12.5	3	37.5	4	50.0	8	100.0

APPENDIX C

General Managers' Evaluation of Influence of Training Program

Table 127. Knowledge and attitudes

Item	Strongly agree		Agree		Neutral		Disagree		Strongly disagree		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
The training program has given me a better understanding of the factors related to farmers' use of fertilizer (and agricultural chemicals).	2	25.0	5	62.5	1	12.5	0	0.0	0	0.0	8	100.0
The training program has given me confidence to go ahead on certain projects which I was considering before the training program.	1	12.5	3	37.5	3	37.5	1	12.5	0	0.0	8	100.0
The training program has given me confidence to carry on expansion in fertilizer department.	4	50.0	3	37.5	0	0.0	1	12.5	0	0.0	8	100.0
The training program has given me more confidence that I can sell my products.	2	25.0	5	62.5	1	12.5	0	0.0	0	0.0	8	100.0

Table 128. Performance

Item	Strongly agree		Agree		Neutral		Disagree		Strongly disagree		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
The training program has provided me with tools to analyze the present and potential market for fertilizer in my trade area.	3	37.5	5	62.5	0	0.0	0	0.0	0	0.0	8	100.0
The training program has provided me with tools that help me to evaluate my current position in the fertilizer business field.	1	12.5	6	75.0	1	12.5	0	0.0	0	0.0	8	100.0
The training program has motivated me to think more about my fertilizer department.	5	62.5	2	25.0	0	0.0	1	12.5	0	0.0	8	100.0
The training program has influenced me to think in terms of a fertilizer program for my farmer customers rather than just selling a ton of fertilizer.	5	62.5	3	37.5	0	0.0	0	0.0	0	0.0	8	100.0
The training program has provided me with tools that help me to evaluate my current position in the agricultural chemical business field.	0	0.0	5	62.5	3	37.5	0	0.0	0	0.0	8	100.0

Table 129. Performance

Item	Strongly agree		Agree		Neutral		Disagree		Strongly disagree		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
The training program has provided a framework for making many management decisions.	0	0.0	5	62.5	2	25.0	1	12.5	0	0.0	8	100.0
The training program has influenced decision process which I go through in planning activities, business operations, and services offered.	1	12.5	3	37.5	2	25.0	2	25.0	0	0.0	8	100.0
The training program has influenced the way I analyze my business operations.	1	12.5	3	37.5	2	25.0	2	25.0	0	0.0	8	100.0
The training program has motivated me to think more about long range planning for all business operations.	1	12.5	5	62.5	2	25.0	0	0.0	0	0.0	8	100.0
The training program has helped me to analyze my promotional and advertising activities.	0	0.0	5	62.5	2	25.0	1	12.5	0	0.0	8	100.0

Table 129. (continued)

Item	Strongly agree		Agree		Neutral		Disagree		Strongly disagree		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
The training program has helped me improve communications between me and my farmer customers.	1	12.5	6	75.0	1	12.5	0	0.0	0	0.0	8	100.0
The training program has motivated me to think more about my agricultural chemicals program.	0	0.0	4	50.0	4	50.0	0	0.0	0	0.0	8	100.0

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